NP-6650 SERIES

SERVICE MANUAL

(for 115V)

REVISION 1

Canon

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INTRODUCTION

This Service Manual is intended to provide basic information for servicing the plain paper copier NP-6650/6150 in the field for the purposes of maintaining its quality and performance.

The copier is designed to enable full automaion of copy word and, to this end, accommodates the following system equipment.

1. Sorter
2. D-ADF, RDF-II or RDF-III

Separate Service Manuals are available for the sorter, D-ADF, RDF-II, and RDF-III so that the discussion in this manual will be limited to the copier and the NP-Editor, with most references to the NP-6650.

In CHAPTER 1 "GENERAL DESCRIPTION," a brief description of the copier's features, a table of its specifications, diagrams of its parts, and a discussion of its operation are given.

CHAPTER 2 "COPYING PROCESS" deals with the inner workings of the copier that are related to the generation of copies.

CHAPTER 3 "OPERATIONS AND TIMING" discusses how the copier's electrical and mechanical systems are related to each other with respect to functions and timing of operations.

In CHAPTER 4 "MECHANICAL SYSTEM," the copier's mechanical system is discussed in relation to its operation, disassembly, reassembly, and adjustment.

CHAPTER 5 "INSTALLATION" gives step-by-step instructions for installing the copier together with items of inspection for each step.

CHAPTER 6 "MAINTENANCE AND SERVICING" contains tables of replacement parts, consumables and maintenance items. Notes to keep in mind, as well as items of inspection and adjustment, are all found in a separately prepared Service Handbook with measures for faulty images and problem operations.

In addition to the above chapters, a set of appendixes is attached to provide electrical information consisting of general timing charts and general circuit diagrams.

The contents of this manual may be updated from time to time to reflect improvements rendered to the product; a Service Information Bulletin will be issued as necessary to cover such changes.

All service persons are expected to be thoroghly familiar with the information contained in this manual and separately prepared Service Handbook, as well as Service Information Bulletins, for quick response to the user's needs.

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Product name	NP-6650/6150	NP-6650II/6150II NP-5060/5020	NP-6650II FS NP-6650II E 1150 only
RDF-II	○	—	—
RDF-IIn	—	○	△
D-ADF	○	—	—
RDF-III	—	—	□
IMAGE EDITING UNIT VI	○	—	—
IMAGE EDITING UNIT VIII	—	○	—
AUTO STAPLER FOLDER AUTO STAPLER II	○	—	—
AUTO STAPLER FOLDER II AUTO STAPLER III	—	○	○
SORTER VII SORTER VII-B	○	—	—
SORTER VIII	○	—	—
STAPLE SORTER	○	—	—
STAPLE SORTER A1 SORTER B1	—	○	○
CD UNIT	○	○	○
CONTROL CARD III/V CONTROL COUNTER	○	○	○

□ : NP-6650II FS △ : NP-6650II E

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CHAPTER 1

GENERAL DESCRIPTION

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I. FEATURES

1. Automaic 2-color copy mechanism, and copying at a speed as high as 50 copies per minute.

The copier is equipped with two built-in developing assemblies; with these assemblies and automatic two-sided or overlay mode, 2-color copies can be obtained by simple key operation. In addition, as many as 50 copies can be made per minute in normal mode.

2. Automatic two-sided copy mode and automatic overlay mode.

With the automatic two-sided or overlay mode, up to 50 two-sided copies or overlay copies can be made without interruption from one-sided and two-sided documents of from a book spread open on the copyboard glass.

3. Trimming, masking, and color conversion for enhanced visual effects.

With the area designation and a press on the color conversion key, six types of trimming, masking, or color conversion copy modes may be selected. The use of the NP-Editor will further facilitate area designation.

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II. SPECIFICATIONS

A. Type

Body	Console
Copyboard	Fixed
Light source	Halogen lamp (250 W)
Lens	Floating-element lens (zoom)
Photosensitive drum	Amorphous silicon

B. System

Copying process		Indirect electrostatic method
Charging		Corona
Exposure		Slit (moving light source)
Copy density adjustment		Automatic or manual
Development		Dry
Paper pick-up	Automatic	2 cassettes + paper deck
	Manual	Multifeed (5 mm deep)
Transfer		Corona
Separation		Corona (electrostatic)
Cleaning		Blade
Fixing		Heat rollers (820 W + 350 W)

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C. Specifications

Document type		Cut sheet, book, 3-D objects (2 kg/4.4 lb. max.)
Document size		Ledger max.
Reproduction ratio	DIRECT	1 : 1 (±0.5%)
	REDUCTION I	1 : 0.647 (±1.0%)
	REDUCTION II	1 : 0.733 (±1.0%)
	REDUCTION III	1 : 0.786 (±1.0%)
	REDUCTION IV	1 : 0.500 (±1.0%)
	ENLARGEMENT I	1 : 2.000 (±1.0%)
	ENLARGEMENT II	1 : 1.294 (±1.0%)
	ENLARGEMENT III	1 : 1.214 (±1.0%)
	Zoom	1 : 0.500 ~ 2.000 (±1.0%)
Warm-up time		4 min (at 20°C)
First copy		3.6 sec (A4, non AE mode, upper cassette)
Continuous copying		999 sheets
Copy size		Ledger max., STMT min.
Copy paper type	Cassette	Plain paper (64 g/m² to 80 g/m²), tracing paper, colored paper
	Manual	Plain paper (64 g/m² to 128 g/m²), tracing paper, colored paper; OHP film (single feed), Canon-recommended postcard, label sheets (single feed)
Two-sided copy	Automatic	Plain paper (64 g/m² to 80 g/m²; NP-6650 only)
	Manual	Plain paper (64 g/m² to 128/m²), colored paper; Canon-recommended postcard
Overlay copy	Automatic	Plain paper (64 g/m² to 80 g/m²; NP-6650 only)
	Manual	Plain paper (64 g/m² to 128 g/m²), colored paper; OHP film, Canon-recommended postcard
Cassette	Claw	None.
	Standard	27 mm deep (about 250 sheets of 80g/m² paper)
	Universal	20 mm deep (about 200 sheets of 80g/m² paper)
Tray		About 100 sheets (80 g/m²)
Non-image area	Leading edge	3.5 ±1.5 mm wide (DIRECT)
	Left/Right	2.5 ±1.3 mm wide
Auto clear		Provided. (2 min standard; variable between 0 to 9 min in 1-min increment)
Auto shut-off		Provided. (2 hr standard; variable between 0 to 300 min in 10-min increment)
Options		Control Cards III and V, Control Counter, CD Unit, Sorters VII-I and -II, Sorter VIII, D-ADF, RDF-II, Stapler Sorter

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D. Others

Operating environment	Temperature	7.5° to 32.5°C
	Humidity	10% to 85%
	Atmospheric pressure	0.6 to 1 atm.
Power source		115V60Hz
Power consumption	Maximum	1.5 kW or less
	Standby	0.252 kWh
	Continuous copying	1.33 kWh
Noise	Copying	55 dB or less (1 m from copier)
	Standby	40 dB or less (1 m from copier)
Ozone (average over 8 hr)		0.1 ppm or less
Dimensions	Width	1152 mm
	Depth	670 mm
	Height	1096 mm (w/RDF-II)
Weight		170.5 kg (w/RDF-II)
Consumables	Copy paper	Wrap to protect against humidity.
	Toner	Avoid direct sunlight; store under 40°C, 85%.
	Developing assembly	Keep in box or pedestal to avoid direct sunlight; store under 30°, 85%.

Table 1-1

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Reproduction ratio		Size		Cassette	copies/min
DIRECT		Ledger (11″ × 17″)		Ledger	29
		Legal		Legal	34
		Letter		Letter	50
		Letter-R		Letter-R	41
		US	(176 to 230 mm) (251 to 290 mm)	US	—
			(176 to 230 mm) (128 to 158 mm)		—
		UL	(307 to 370 mm) (193 to 226 mm)	UL	—
REDUCTION	I	Ledger → Letter		Letter-R	33
	II	Ledger → Legal		Legal	27
	III	Legal → Letter		Letter-R	33
ENLARGEMENT	I	—		—	—
	II	Letter → Ledger		Ledger	29
	III	Legal → Ledger		Ledger	29

Table 1-3

Specifications are subject to change without notice for product improvement.

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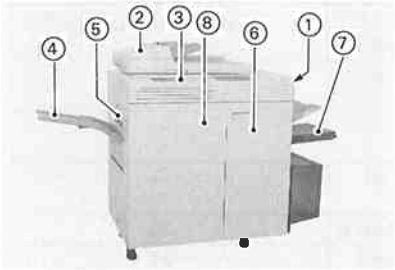
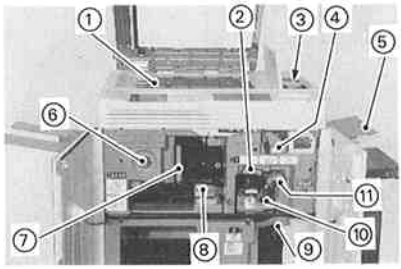
III. NAMES OF PARTS

A. Exterior View



① Power switch
② RDF-II
③ Control panel
④ Copy tray
⑤ Delivery unit cover
⑥ Front right door
⑦ Cassette
⑧ Front left door

Figure 1-1



① Copyboard glass
② Transfer/Separation corona unit
③ Hopper for black
④ CD unit
⑤ Multifeed tray
⑥ Fixing assembly knob
⑦ Feeder unit 1 release lever
⑧ Tray guide plate
⑨ Paper feed guide release lever
⑩ Pick-up unit 2 release lever
⑪ Lower transfer guide unit release lever

Figure 1-2

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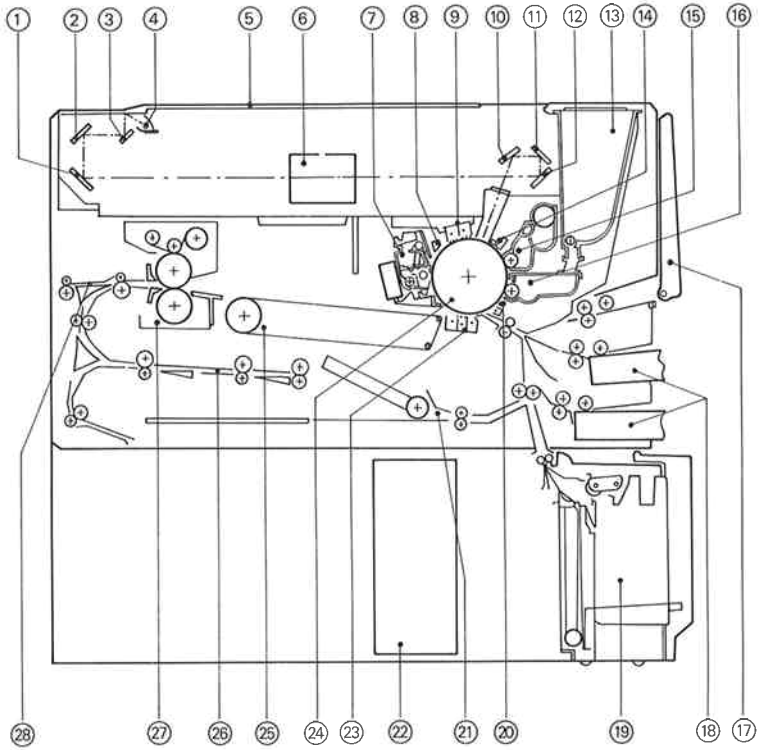
B. Cross-Sectional View



① Mirror 3
② Mirror 2
③ Mirror 1
④ Scanning lamp
⑤ Copyboard glass
⑥ Lens
⑦ Drum cleaning unit
⑧ Pre-conditioning exposure lamp
⑨ Primary corona unit
⑩ Mirror 6
⑪ Mirror 5
⑫ Mirror 4
⑬ Hopper unit
⑭ Blank exposure lamp
⑮ CD unit
⑯ Black developing assembly
⑰ Multifeed tray
⑱ Cassettes
⑲ Paper deck
⑳ Pre-transfer corona unit
㉑ No. 2 paper pick-up unit
㉒ Waste toner receptacle
㉓ Transfer/Separation corona unit
㉔ Drum
㉕ No. 1 feeder unit
㉖ No. 2 feeder unit
㉗ Fixing assembly
㉘ Delivery unit

Figure 1-3

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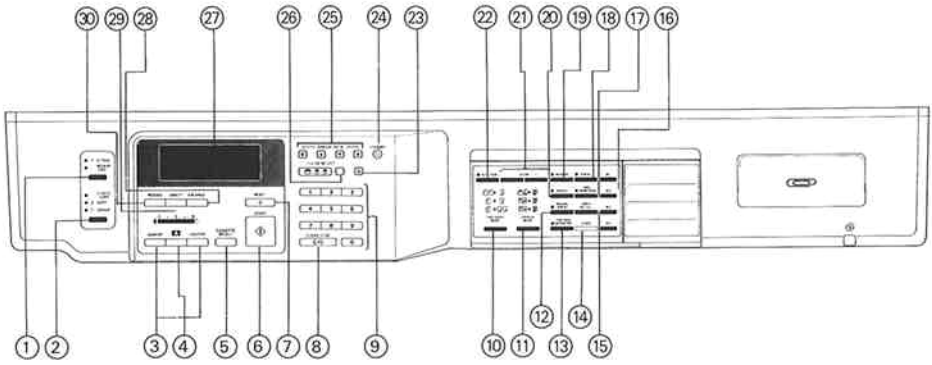
IV. OPERATION

A. Control Panel



① PAPER FOLD key
② SORT/GROUP/STAPLE key
③ COPY DENSITY key
④ AE key
⑤ CASSETTE SELECTION key
⑥ COPY START key
⑦ RESET key
⑧ CLEAR/STOP key
⑨ INPUT keys
⑩ TWO-SIDED MODE key
⑪ OVERLAY MODE key
⑫ AREA DESIGNATION key
⑬ PAGE SEPARATION key
⑭ GUIDE key
⑮ AREA RECALL key
⑯ COPY MODE MEMORY key
⑰ SHEET FRAME ERASE key
⑱ FRAME ERASE key
⑲ BINDING MARGIN key
⑳ PHOTO MODE key
㉑ ZOOM key
㉒ AUTO REPRODUCTION RATIO key
㉓ ID key
㉔ STANDBY key
㉕ DISPLAY key
㉖ COLOR SELECTION key
㉗ MESSAGE display
㉘ ENLARGEMENT key
㉙ DIRECT key
㉚ REDUCTION key

Figure 1-4 (NP-6650)

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B. Basic Copy Operation

1) Shift the POWER switch to 'I'.
① If the temperature of the fixing assembly is below the specified value, 'WAIT' lights in red.
② If the temperature of the fixing assembly is of the specified value or above, 'WAIT' lights in green.
③ Normally, the warm-up is four minutes (room temperature, 20°C).
2) Open the copyboard cover, and set the document face down aligned with the size index.
3) Press the DIRECT, REDUCTION, ENLARGEMENT, or ZOOM key to select the reproduction ratio desired.
4) Select the cassette holder holding the cassette to be used if a particular paper size is desired.
① Replace the cassette if necessary.
5) Press the COPY DENSITY key to select copy density suited to the document.
① For a higher copy density, press the 'DARKER' key; this will move the copy density indicator to the left. To obtain lower density, on the other hand, press the 'LIGHTER' key; this will move the copy density indicator to the right.

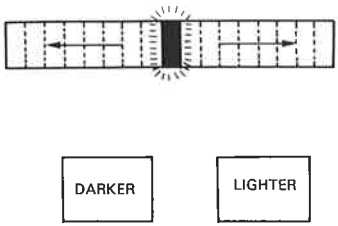

Figure 1-5

6) Specify the number of copies desired (1 to 999) with the input keys; check the number on the 'MESSAGE' display.
① If the input keys do not work, or to correct a mistake, press the CLEAR/STOP key and specify the number again.
7) Select the developing assembly with the color desired.
① Replace the developing assembly if necessary.
8) Press the COPY START key.
① If a D-ADF or RDF is used, the document(s) on the document tray will be picked up automatically and the copy operation will start.
② Copies in numbers specified will be made automatically.
③ Keys for copy modes other than the CLEAR/STOP and COPY DENSITY keys will not work between the first and last copies.
④ Between the first and last copies, a change from automatic to manual density control can be made; however, a change from manual to automatic is not possible.

Note:
If copies prove to be too dark or too light in the AE mode, use the 'COPY DENSITY' display as reference and press the COPY DENSITY key until the desired density is obtained; the method will not interrupt the copy operation.

⑤ To stop continuous copy operation, press the CLEAR/STOP key; the copy operation will stop after finishing the copy cycle in effect.
⑥ The number on the 'MESSAGE' display upon completion of copy operation is the number specified initially. If the ADD PAPER indication lights in the middle of copy operation and the copy operation stops, a press on the COPY START key again after setting paper and cassette will finish the remaining number of copies automatically.
⑦ A jam in the middle of copy operation causes 'JAM' to light on the display, and the copy operation stops.
The number on the 'MESSAGE' display after removal of the jam is the remaining number of copies.
⑧ If left alone for about two minutes after finishing copy operation or operating a key, the copier returns to its standard mode. (This auto-clear time can be changed if desired.)

C. Pre-Heat Mode

A press on the STANDBY key during warm-up will activate the pre-heat mode and all indications except 'STANDBY' on the panel will go out.
① The indications on the control panel cannot be returned by pressing the keys on the panel; the STANDBY key, however, is effective.
② A press on the STANDBY key once again clears the pre-heat mode.
③ The pre-heat mode controls the temperature of the fixing assembly by maintaining it 5°C lower than normal.
④ The pre-heat mode is canceled when the control Card/ Counter is inseted.

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D. Binding Mode

A press on the BINDING MARGIN key produces copies with a binding margin.

① Copies made in the binding mode will have a margin on the right or left. The width of the margin is specified by the asterisk mode between 1 mm and 20 mm.

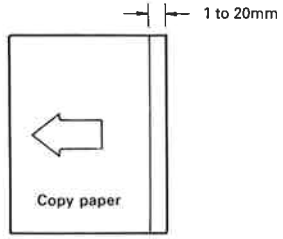

Figure 1-6

E. Document Frame Erasing Mode

A press on the DOCUMENT FRAME ERASING key produces copies with white margins on three sides of the document each about 2.5 mm in width.

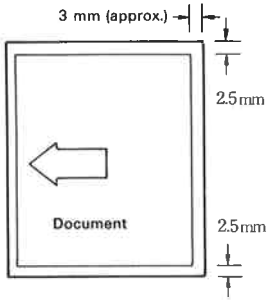

Figure 1-7

F. Sheet Frame Erasing Mode

A press on the SHEET FRAME ERASING key produces copies with white margins on all four sides of the copies about 7.5 mm in width.

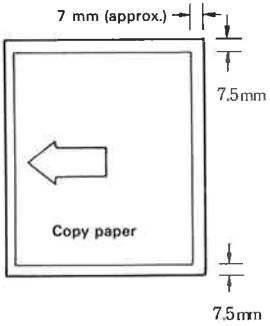

Figure 1-8

G. Two-Sided Copy Operation

1. Automatic Two-Sided Copy Operation (NP-6650 only)

A press on the TWO-SIDED COPY key produces two types of two-sided copy.

① Two-Sided Copy from One-Sided Document
- Use of a D-ADF/RDF makes replacement of documents easier.
- A press on the PAGE SEPARATION key at the same time produces two-page separation/two-sided copies.

② Two-Sided Copy from Two-Sided Document
- This operation is possible only for copiers equipped with a D-ADF/RDF.

2. Manual Two-Sided Copy Operation

Two-sided copies can be produced manually using the multifeeder tray. Take note of the following in making use of this feature.

① Turn over the copy when its first side is completed; do not turn it around, but feed the same edge first into the copier.
② Make sure that the copy paper is not moist or curled.

H. Overlay Copy Operation

1. Automatic Overlay Copy Operation (NP-6650 only)

① A press on the OVERLAY key produces overlay copies.
② A press on the PAGE SEPARATION key at the same time produces page separation/overlay copies.

2. Manual Overlay Copy Operation

Overlay copies can be produced manually using the multifeeder tray. Take note of the following when making use of this feature.

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① Make sure that the copy paper is not moist or curled.
② Make sure that the paper has cooled enough before the second copy operation; this holds true for OHP film in particular.

I. Automatic Selection of Paper Size

When this mode is selected, the copier automatically selects the cassette (copy paper) best suited to the document size and reproduction ratio.

If neither of the cassettes contains such paper, the copier selects the cassette with paper that can hold the most image (spatial) and indicates its selection on the display. The copy operation starts upon a press on the COPY START key. The copy operation is stopped by a press on the CLEAR/STOP key.

J. Automatic Selection of Reproduction Ratio

When this mode is selected, the copier automatically selects the reproduction ratio best suited to the document size and the cassette (copy paper).

Documents, if not of standard size, are identified as one of the standard sizes; for this reason, this mode is executed within the ratios available for standard document sizes.

K. Color Conversion

An area or areas can be specified over the document (up to eight areas if rectangular). Copies may be of the inside of the area(s) only (trimming) or of the outside of the area(s) only (masking); in addition, the inside and outside of the area(s) may be copied in different (two) colors.

The area is formed by the blank exposure lamp; as such, the area specified and that on the copy may have a discrepancy of 6 ± 1.3 mm.

L. Replacing the CD Unit

1) Open the front right door.
2) Slide the CD unit out to the front.
3) Hold the handle of the CD unit, and lift it with care.

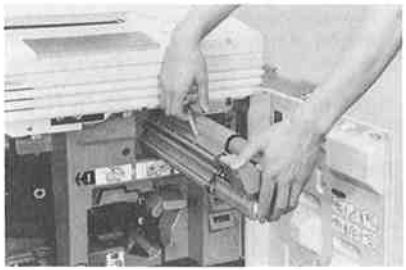

Figure 1-9

4) Set the CD unit desired with care, and slide it inside.
5) Close the right front door.

Note:
1. Do not tilt or shake the CD unit.
2. Do not place the CD unit on the floor; always keep it in its box when not in use.

M. ID Mode

With the ID mode, copies will not be made unless an ID No. is entered; the ID No. consists of four digits and is registered in advance.

A total of 25 ID Nos. may be registered. As counts can be made for each ID No. (copies made), copy loads can be monitored for each group, section, department, etc.

1. Registering an ID No.

1) Press the ☒ → 🆔 → AUTO ZOOM → ☒ keys.
2) Press the # key, and enter a four-digit ID No. with the input keys.
3) Press the ☒ key to return to the standard screen.

2. Entering the ID No.

1) Enter the ID No. (registered) with the ten-key pad.
2) Press the 🆔 key.
   The copier will be ready for copying.
3) Make copies.
4) Press the ⏻ key when copying is complete.
   The copier will return to the ID mode, in which copies cannot be made unless an ID No. is entered once again.

3. Count Control

Counts can be indicated by ID No.; counts refer to the total number of copies that have been made up to that point in time.

1) Press the ☒ → 🆔 → ☒ → AUTO ZOOM ⏻ keys.
2) Press the # key.

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3) Press the ⇩ key to indicate the counts representing the number of copies made; each press will indicate the counts in succession for each ID No.

4. Clearing the Counts for All ID Nos.

1) Press the C/S key.

Note:
The counts cannot be cleared on a single ID No. basis.

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N. Asterisk Mode (user mode)

The asterisk mode enables the user to make mode settings of his/her choice.

<table>
<tr><th>Key operation</th><th>Description</th><th>Operations/Remarks</th></tr>
<tr><td>[*] → [1] → [*]</td><td>● Selecting the reproduction ratio.
The optimum reproduction ratio is automatically selected in response to the document size and desired copy size entered.</td><td>If the calculation result is 50% or less, 50% will be selected; if 200% or more, 200% will be selected.</td></tr>
<tr><td>[*] → [2] → [*]</td><td>● Mixing documents of mixed sizes.
Documents set on the feeder may be of different sizes as long as they are of the same feed size (e.g., A4 and A3). The paper size and reproduction ratio will be automatically selected according to the size of each document.</td><td>[1] : OFF ..... mixing not
[2] : ON ..... Mixing allowed.
Mixed documents are checked for size for each document. The copy speed therefore will slow down.</td></tr>
<tr><td>[*] → [3] → [*]</td><td>● Selecting the left/right binding.
The location of binding margins in the binding mode and copy priority between right and left pages in the page separation mode will be specified.</td><td><table><tr><th></th><th>[1] : L binding</th><th>[2] : R binding</th></tr><tr><td>Margin</td><td>L binding</td><td>R binding</td></tr><tr><td>Page separation</td><td>L page first</td><td>R page first</td></tr></table>Normally, left binding is selected.</td></tr>
<tr><td>[*] → [4] → [*]</td><td>● Specifying the auto-clear time.
The time for auto-clear will be specified between 1 min and 9 min at 1-min. increment.</td><td>If set to 0 min, the auto-clear mechanism will be disabled.</td></tr>
<tr><td>[*] → [5] → [*]</td><td>● Specifying the date and time.</td><td>—</td></tr>
<tr><td>[*] → [6] → [*]</td><td>● Cover page mode.
See p. 1-15.</td><td>● Without cover.
● Black copy as cover.
● Color copy as cover.</td></tr>
<tr><td>[*] → [7] → [*]</td><td>● Canceling the document count mode for RDF-II.
In making two-sided copies from a one-sided document with the RDF-II, the number of documents are automatically counted. The feature can be canceled.</td><td>[1] : OFF
[2] : ON</td></tr>
<tr><td>[*] → [8] → [*]</td><td>● Cleaning the corona wires.
The primary, transfer, and separation corona unit wires will be automatically cleaned.</td><td>[1] : OFF
[2] : ON</td></tr>
<tr><td></td><td>● Storing the copy modes.
Up to four copy modes (any) can be stored in the memory.</td><td>1) Press the copy mode key desired.
2) Press the [*] key.
3) Press the COPY MODE MEMORY key (M1, M2, M3 or M4).
4) Press the [*] key.</td></tr>
</table>

Table 1-4

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1. Cover Mode

The cover mode is used in combination with an RDF-II or D-ADF; paper different from that used for the body of the document can be added as a cover page.

The paper used as the cover page is picked up from the upper cassette; therefore, it is necessary that the paper be placed in the upper cassette before starting copy operation.

1. Copy on Cover Page

   The last document fed from the RDF-II or D-ADF will be automatically copied onto the cover page.

2. No Copy on Cover Page

   Place a blank sheet of paper on top of the stack of document pages. Make sure that the sheet is of the same size as the document pages.

The blank sheet will be copied on the cover page.

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V. WARNING INDICATIONS AND CORRECTIVE ACTIONS

A. Jam Indication

When a jam is indicated on the display of the control panel, make a check and take a corrective action as follows; for jams occurring in options (sorter, RDF), refer to the Service Manual of the appropriate options.

In general, if the jam is in the copier, check the pick-up unit, separation/feeder unit, fixing/delivery unit, cleaning unit, and duplexing/feeder unit, and make sure that no paper is left behind. The location lamps shown in Figure 1-10 comes into view and light when the front door is opened for identification of the jam location.

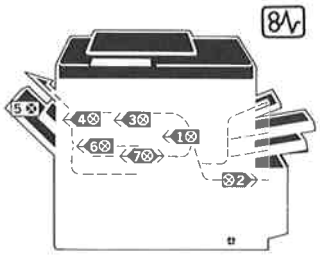
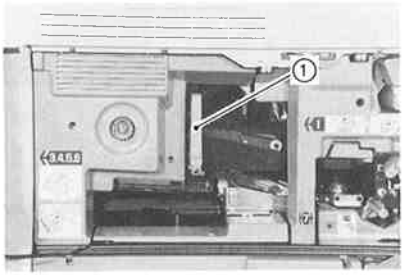


Figure 1-10

1. When lamp 1 lights,

1) Turn the release lever of the feeder unit clockwise, and remove the copy paper.



① Release lever

Figure 1-11

2) Check the cassette holder selected.

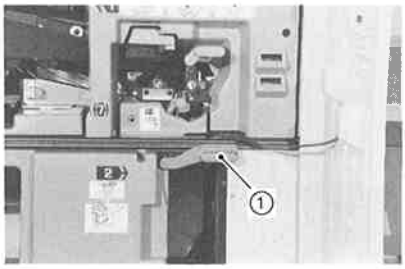
a. Remove the cassette from the cassette holder, and remove the copy paper from the pick-up unit.

- If copy paper sticks out of the cassette, remove it.

b. If copy paper from the multifeed tray has jammed, pull it back out.

2. When lamp 2 lights,

1) Turn the paper deck feed guide plate release lever down.



① Release lever

Figure 1-12

2) Open the door of the paper deck, and remove the copy paper.
3) Close the door of the paper deck.

3. When lamp 3, 4, 5, or 6 lights,

1) Take away the copies from the copy tray.
2) Open the delivery unit.
3) If the jam is between the fixing rollers, turn the fixing assembly knob counterclockwise, and remove the copy paper.

Figure 1-13

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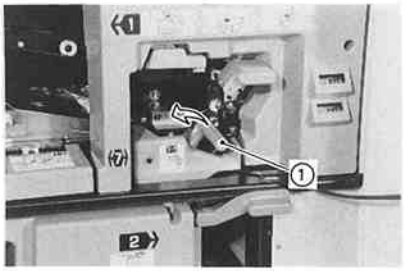
4. If lamp 7 lights

1) Turn the release lever of the No. 2 pick-up unit counterclockwise.



① Release lever

Figure 1-14

2) Pull the tray guide plate to the front, and remove the copy paper.

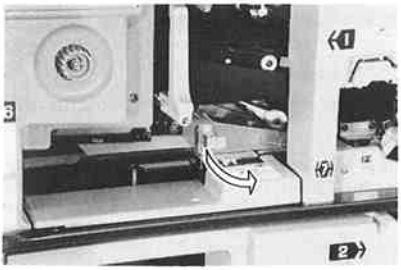


Figure 1-15

5. After Removing the Jam

1) Return all levers to their original positions.
2) Close all covers and delivery unit.

B. ADD PAPER Indication

If no cassette is set in the cassette holder selected or no paper is in the cassette, 'ADD PAPER' will be indicated on the display.

1) Pull the cassette out of the cassette holder selected.
2) Set paper in the cassette.

Figure 1-16

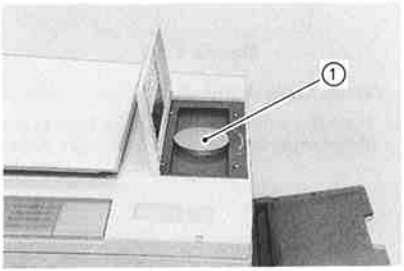
3) Set the cassette in the cassette holder.

C. ADD TONER Indication

When the toner inside the hopper or developing unit is running short, 'ADD TONER' will be indicated on the display.

1. Supplying the Black Toner

1) Open the hopper cover, and remove the cap from the hopper.



① Cap

Figure 1-17

2) Shake the toner bottle up and down several times.

Figure 1-18

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3) Remove the seal from the opening of the toner bottle.
4) Fit the toner bottle over the opening of the hopper.
5) Hold the toner bottle with one hand, and turn the tab of the bottle clockwise 90°.

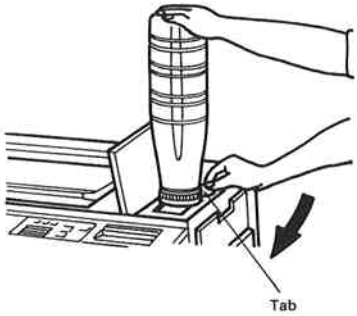

Figure -19

6) Tap the toner bottle on its bottom and side several times so that all of the toner will fall into the hopper.
7) Turn the tab of the toner bottle counter-clockwise 90°, and remove the toner bottle.
8) Install the cap and close the hopper cover.

2. Supplying the Color Toner

1) Open the front door.
2) Turn the empty cartridge clockwise, and pull it out to the front.
- Put the empty cartridge back into its box; the box holds two cartridges.

3) Make sure that the toner of the new cartridge is of the right color, and shake the cartridge end-to-end about 10 times. Set the cartridge in the holder, aligning the tab at the tip of the cartridge with the groove on the holder. Push the cartridge in the holder along the groove while peeling the seal with care as in Figure 1-20.

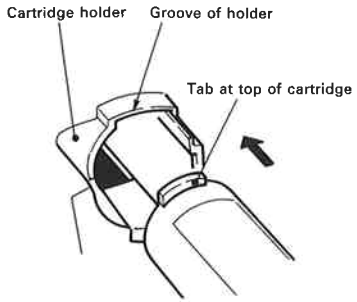

Figure 1-20

4) When the cartridge is fully inside, turn its tab slowly four to five times.

Note:
Supply a cartridgeful of toner; keep the cartridge inserted.

5) Close the front door.

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VI. ROUTINE INSPECTION BY THE USER

Instruct the user to clean the following parts at least once a week.

1. Copyboard Glass
   Wipe it with a moist cloth; then, wipe it dry.
2. Copyboard Cover and Feed Belt
   Wipe it with mild detergent solution; then, wipe it dry.

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CHPATER 2

COPYING PROCESSES

I. IMAGE FORMATION PROCESS 2-1

II. AUXILIARY PROCESSES 2-6

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I. IMAGE FORMATION PROCESS

A. Outline

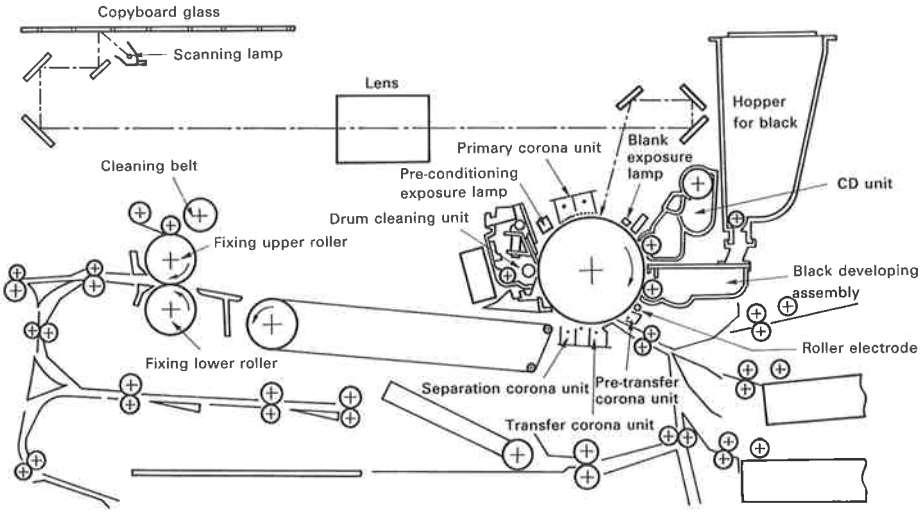

Figure 2-1

The copier is an electrophotographic copier equipped with a photosensitive drum. See Figure 2-1 for its construction. Images are formed in the following nine steps.

Step 1 Pre-conditioning exposure
Step 2 Primary corona (positive DC)
Step 3 Image exposure
Step 4 Development (AC and positive DC)
Step 5 Pre-transfer corona (AC and negative DC)
Step 6 Transfer corona (positive DC)
Step 7 Separation corona (AC and positive DC)
Step 8 Fixing
Step 9 Drum cleaning

Figure 2-2 is a sequential diagram which shows how steps involved in forming images are related to each other.

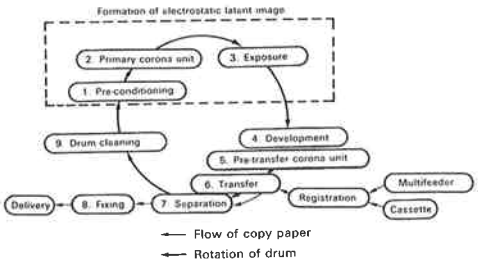

Figure 2-2

The photosensitive drum is of a two-layer construction; its outer layer is made of amorphous silicon, and the inner layer is an aluminum base made of conductor.

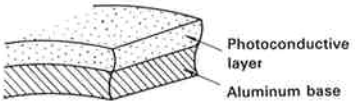

Figure 2-3

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B. Formation of Electrostatic Latent Image

This block consists of the first three steps of the image formation process; at its end, the areas of the drum corresponding to dark areas of the document are left with positive charges, and those representing light areas are rid of positive charges.

The pattern of charges so formed is not visible to the human eye and, therefore, is called an "electrostatic latent image."

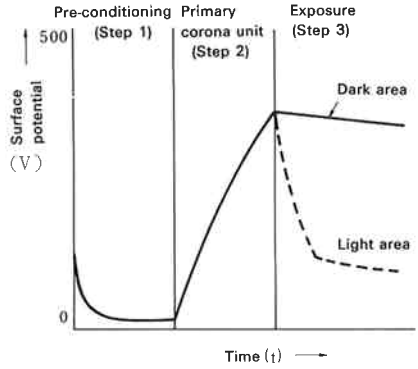

Figure 2-4

C. Step 1 Pre-conditioning exposure

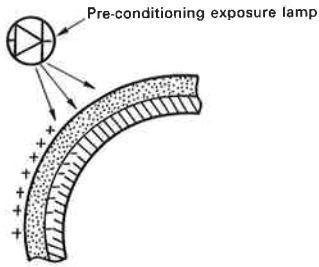

Figure 2-5

In this step, or pre-conditioning exposure, the surface of the drum is exposed to light from the pre-conditioning exposure lamps. All charges remaining on the surface of the drum from the preceding copy cycle are eliminated in preparation for exposure by the primary corona. Such charges, if left as they are, could result in copies with uneven density.

D. Step 2 Primary corona

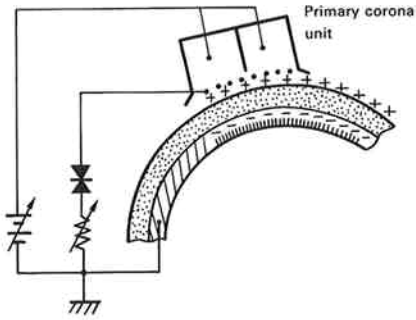

Figure 2-6

In this step, the drum is exposed by the primary corona. As a result, its surface will come to have a uniform layer of positive charges and maintain primary potential.

E. Step 3 Image exposure

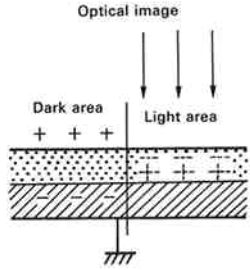

Figure 2-7

In this step, the optical image of the document is projected on the surface of the drum to neutralize the charges in light areas.

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F. Step 4 Development

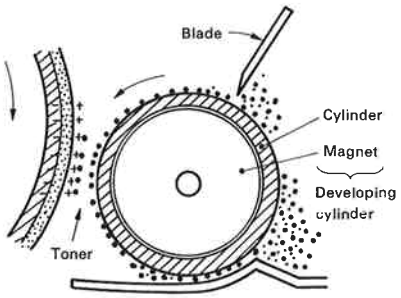

Figure 2-8

As shown in Figure 2-8, the developing assembly consists of a developing cylinder and a magnetic blade; the developing cylinder itself is made up of a magnet fixed in position and a cylinder which rotates around the magnet.

The black developer is composed of magnetite and resin.

The developer has insulating properties and is charged to a negative potential by friction against the rotating cylinder.

The color developer is a fixed-ratio mixture of carrier (iron powder) and toner (resin). By friction against the rotating cylinder, the iron powder is charged to a positive potential, and the toner to a negative potential.

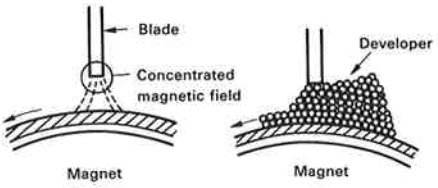

Figure 2-9

A concentrated magnetic field develops between the magnet and the tip of the blade, and the developer is attracted to the magnetic field.

The magnetic field holds the developer it has attracted virtually immobile and creates a collection of developer particles hanging from the tip of the blade. As the cylinder rotates, the developer particles leave the magnetic field to deposit themselves on the cylinder in a thin, uniform layer.

Since both the developing cylinder and blade are given an AC bias and DC bias (positive component) at the same time, the resulting wave form of the developing bias has a larger positive component than negative.

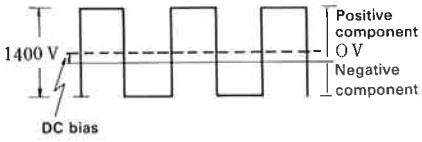

Figure 2-10

During development, the toner is attracted to the drum by the work of the surface potential of the drum and the developing bias (at time of negative component) and turns the electrostatic latent image to a visible image. Excess toner is repelled by the surface potential of the drum and the developing bias (at time of positive component).

G. Step 5 Pre-transfer corona

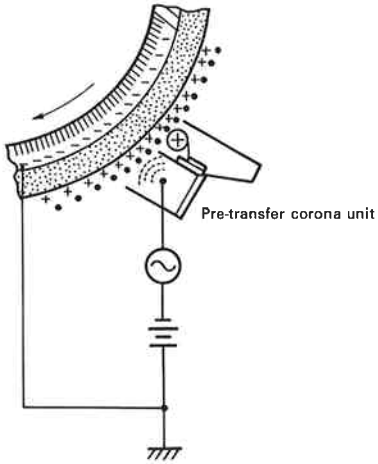

Figure 2-11

In this step, an AC corona discharge in combination with a DC bias optimizes the potential of the toner on the drum surface and, at the same time, eliminates excess charge from the drum surface. This serves to improve transfer efficiency and facilitate separation of the copy paper from the drum.

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H. Step 6 Transfer corona

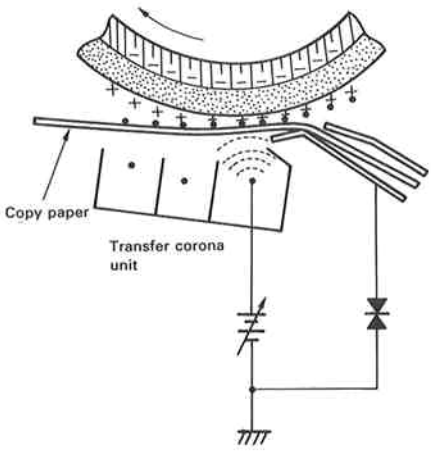

Figure 2-12

In this step, a positive corona is applied to the back of the copy paper so as to attract the negatively charged toner to the paper.

To prevent poor transfer or soiling on the back of the paper, the transfer guides are grounded through a varistor.

Note:
If grounded directly, the transfer guides will allow the charge needed on the back of the copy paper to escape; if not grounded, on the other hand, the transfer guides will be charged, coated with toner, and become soiled.

Once having left the fixing assembly, the copy paper is dried by the heat and has a high electrical resistance.

For this reason, during the second copy cycle in the automatic two-sided or overlay copy mode, the transfer corona discharge is reduced to prevent poor separation of the copy paper after transfer.

I. Step 7 Separation corona

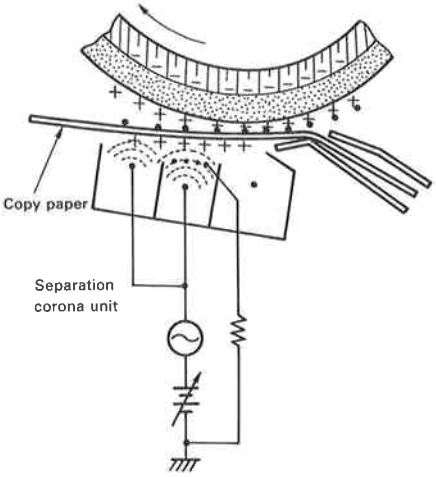

Figure 2-13

Step 7 is where copy paper is separated from the drum. The copy paper has been given a positive potential by the transfer corona and attracted to the surface of the drum by the work of electrostatic force. To separate the paper from the drum, an AC corona with a DC bias is applied to break the electrostatic force between the drum and paper.

The copy paper comes out of the fixing assembly with curl. For this reason, the output of the separation corona discharge during the second copy cycle in the automatic two-sided or overlay mode is varied to ensure proper separation.

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J. Step 8 Fixing

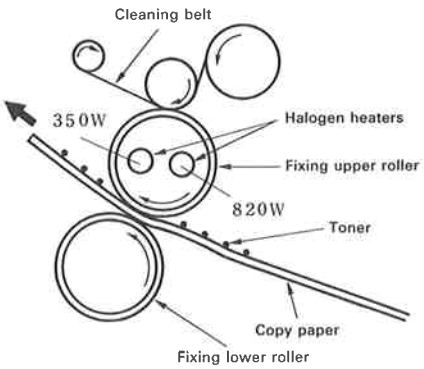

Figure 2-14

In this step, the copy paper carrying a toner image moves between two heated rollers, and the toner image is fixed to the paper.

To prevent jams and toner offset, the upper roller remains in contact with a cleaning belt impregnated with silicone oil; the take-up mechanism advances the point of contact on the cleaning belt, thereby cleaning the upper roller and, at the same time, applying the silicone oil.

K. Step 9 Drum cleaning

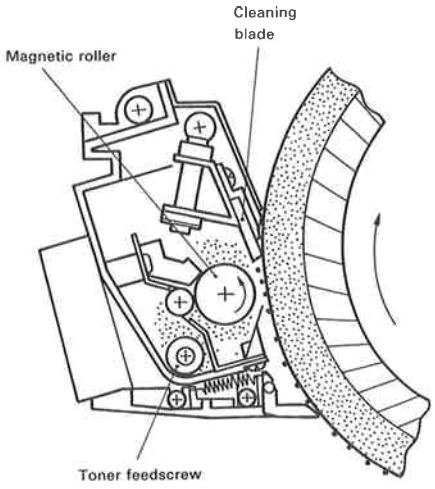

Figure 2-15

In this step, toner remaining on the drum surface is scraped off by the cleaning blade and collected by the magnet roller so as to prepare for the next copy cycle.

The toner so collected is forwarded by the waste toner feedscrew to the waste toner receptacle.

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II. AUXILIARY PROCESSES

A. Roller Electrode

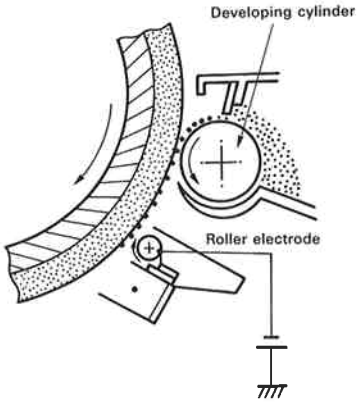

Figure 2-16

A DC bias (negative component) is applied to the roller electrode to collect stray toner.

B. Separation Claw

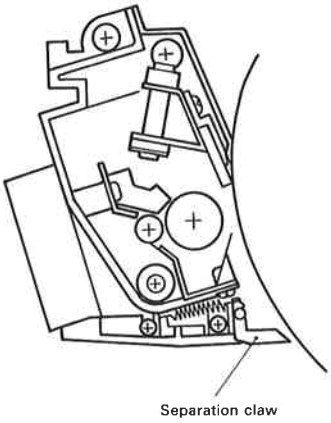

Figure 2-17

The copy paper can advance into the cleaning unit if not separated properly from the drum because of faulty pre-transfer or separation corona operation or owing to faulty paper feed. The separation claw is located at the bottom of the cleaning unit and serves to hook off the copy paper, preventing its advance into the cleaning unit.

C. Blank Exposure Lamp

The blank exposure lamp eliminates the surface potential of the drum over non-image areas so as to keep the drum free from excess toner.

The copier has zoom capability for the selection of reproduction ratios; to deal with varying non-image areas, the blank exposure lamp of the copier is composed of an array of LEDs.

D. Ozone Filter

The exhaust fan and feeder unit fan are equipped with an ozone filter, which breaks down the ozone generated by the coronas into oxygen by catalytic action.

E. Static Charge Eliminator

Copy paper prior to delivery has residual charge it has picked up at time of transfer. A grounded steel-wool brush is provided at the exit of the delivery unit to serve as a static charge eliminator.

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CHAPTER 3

OPERATIONS AND TIMING

1. In outline diagrams, ▬▬ represents mechanical drive paths, and ⟶ indicates electrical signal paths.
   "POWER ON" in this chapter means turning the power switch ON and closing of the delivery and front doors; this operation supplies the copier with 24V DC.
2. Signals in digital circuits are identified as '1' for High and '0' for Low. The voltage, however, depends on the circuit.
   Nearly all operations of the copier are controlled by microprocessors. As the processors are not part relevant to the service person's work, their internal operations are not described here. Further, as PCBs are not repaired at the user's premises, the operation of the circuits are explained by means of block diagrams rather than circuit diagrams.
   For the purpose of explanation, circuits are divided into the following: from sensors to DC controller PCB input ports; from DC controller PCB output ports to loads; miscellaneous control circuits and their functions.

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I. BASIC OPERATIONS

A. Functional Blocks

The copier can be divided into four functional blocks; i.e., paper pick-up and feed system, exposure system, image formation system, and control system.

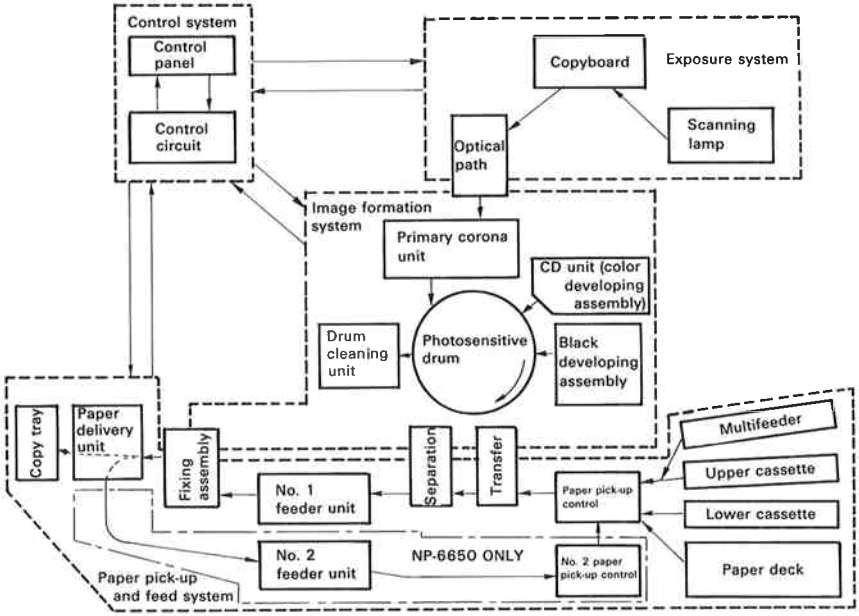

Figure 3-1

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B. Electrical Circuitry

The electrical operations of the copier are controlled by two microprocessors and one communication IC on the DC controller PCB.

The functions of these two microprocessors and one communication IC are as follows:

1) Q101 (master; M)
   - Controls copy sequence
   - Controls control panel
   - Controls main motor and scanner motor
   - Controls surface potential of drum
2) Q242 (slave; S)
   - Controls blank exposure LEDs
   - Controls scanning lamp
   - Controls tray drive motor, cleaning belt motor, and lens motor
   - Controls fixing roller temperature (thermistor)
   - Detects document size
3) Q120
   - Communication with RDF/D-ADF, sorter, and others

The master has three ROMs and two RAMs connected to it and communicates with the slave as necessary for data transfer.

Figure 3-3 is a block diagram showing the relationship among the major circuits of the copier.

The DC controller PCB communicates with the controller PCB of the RDF/D-ADF and sorter for control of these options.

The input section of each microprocessor is equipped with a buffer and the output section, with a driver. These, however, are left out of the block diagram.

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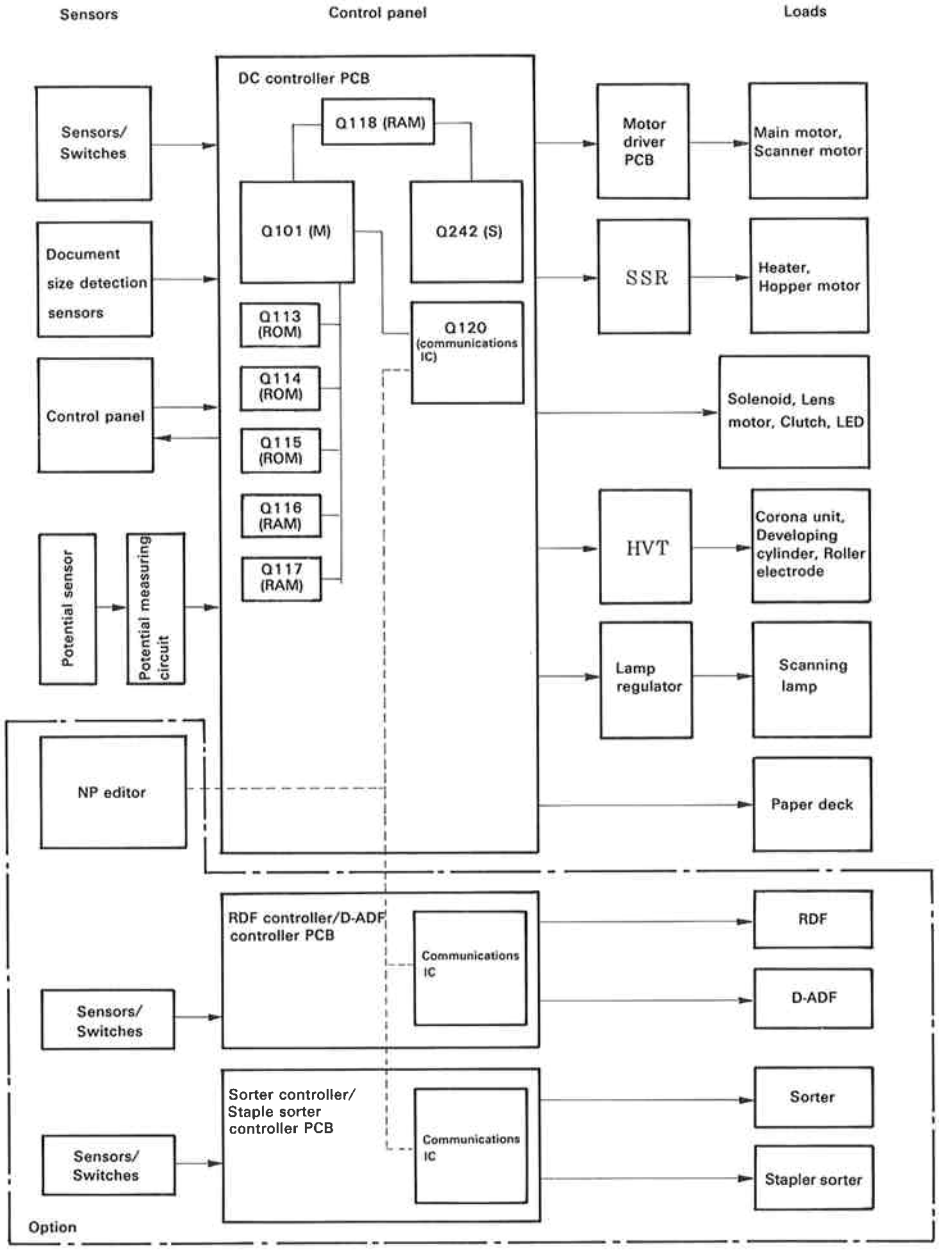

Figure 3-3

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C. DC Controller Input

1. Input from Sensors and Switches (1/5)

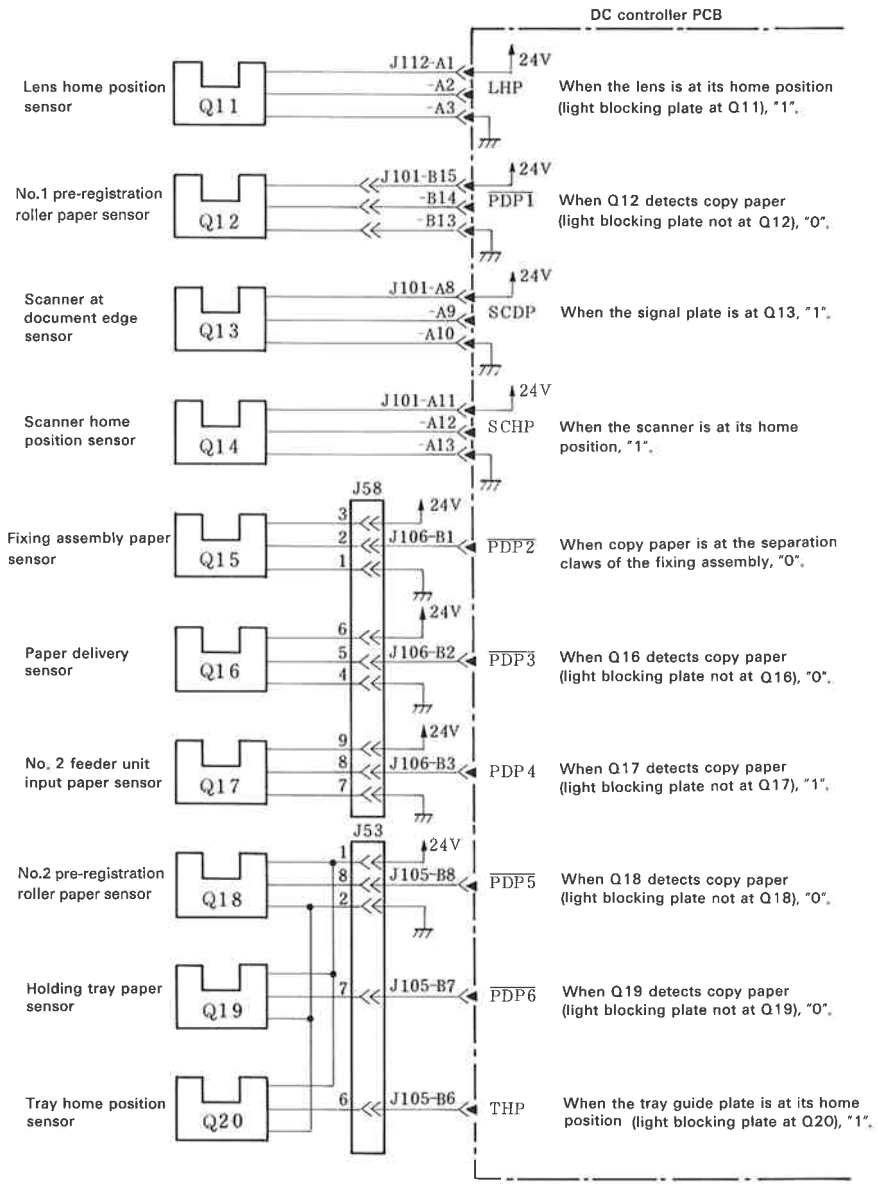

Figure 3-4

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2. Input from Sensors and Switches (2/5)

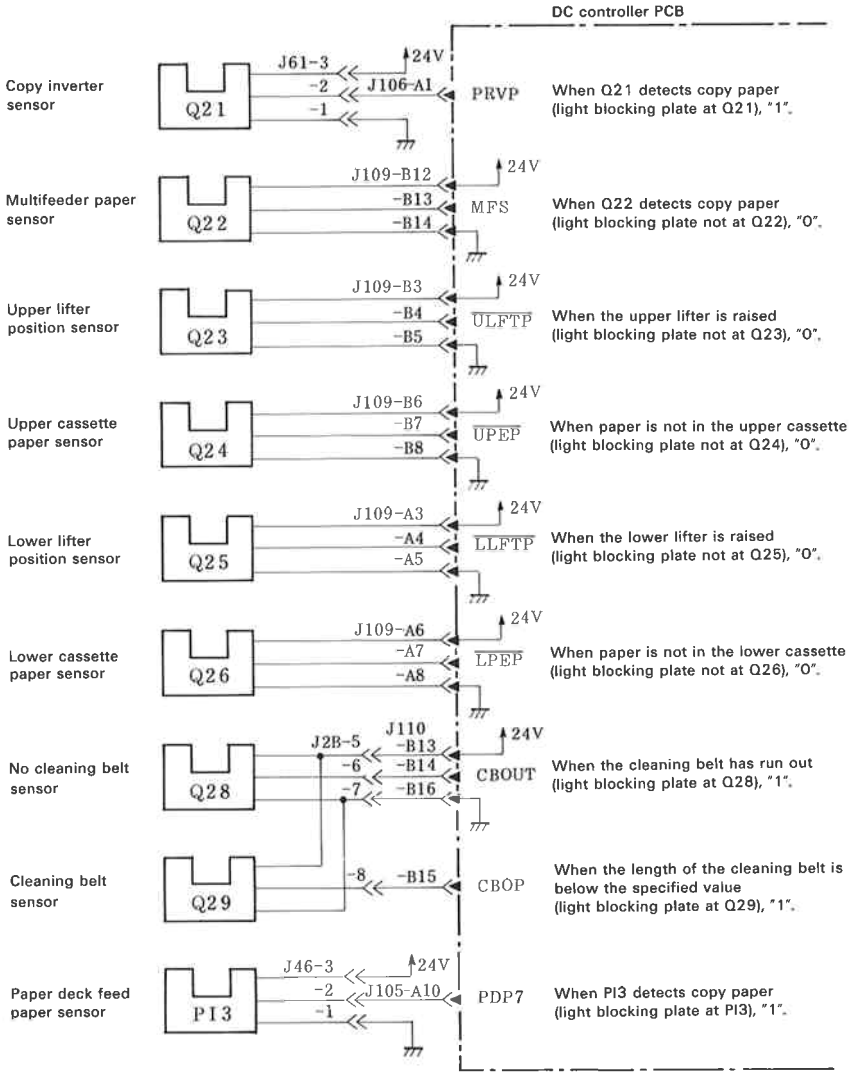

Figure 3-5

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3. Input from Sensors and Switches (3/5)

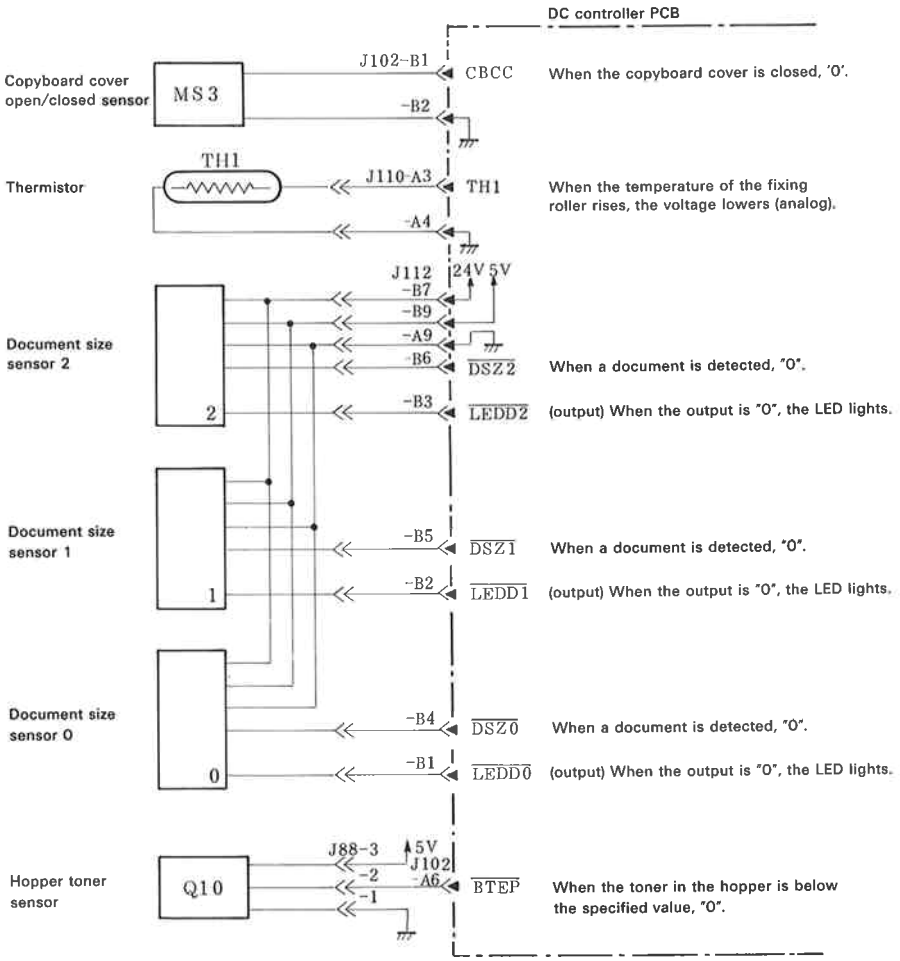

Figure 3-6

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4. Input from Sensors and Switches (4/5)

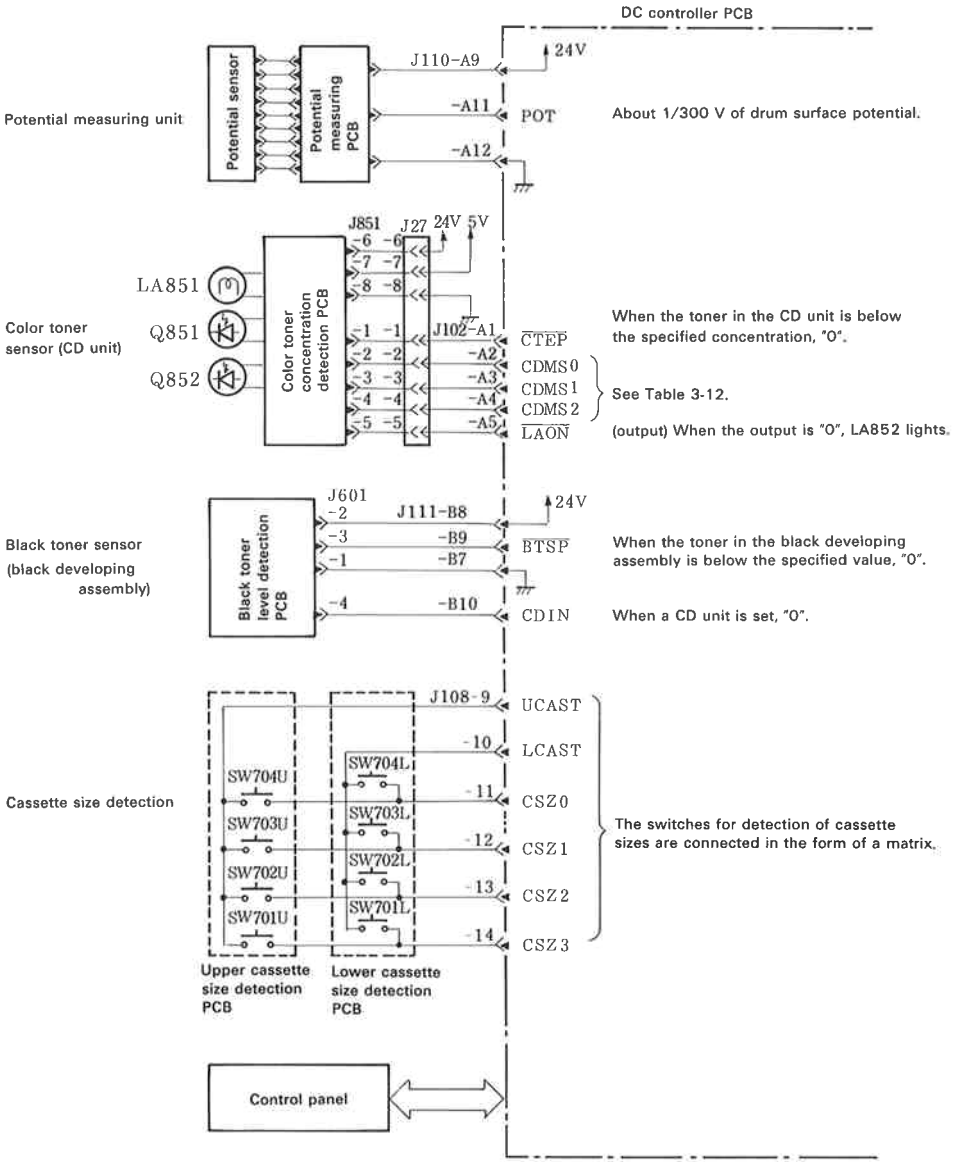

Figure 3-7

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5. Input from Sensors and Switches (5/5)

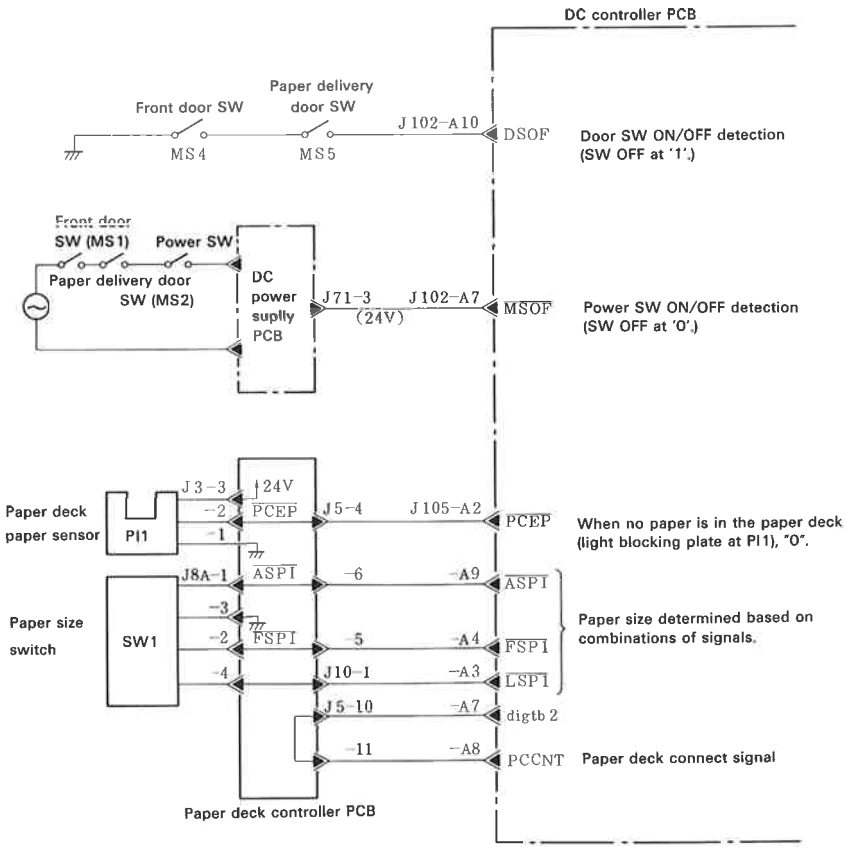

Figure 3-8

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D. DC Controller Output

1. Output from the DC Controller PCB (1/5)

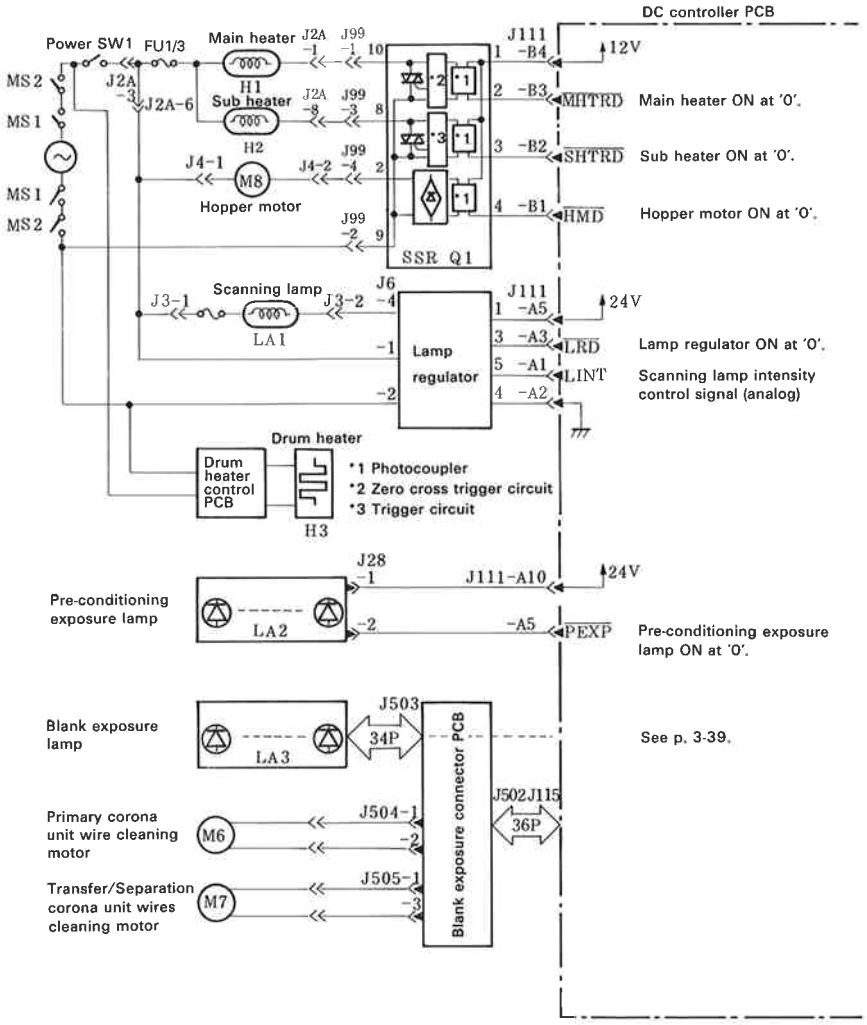

Figure 3-9

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2. Output from the DC Controller PCB (2/5)

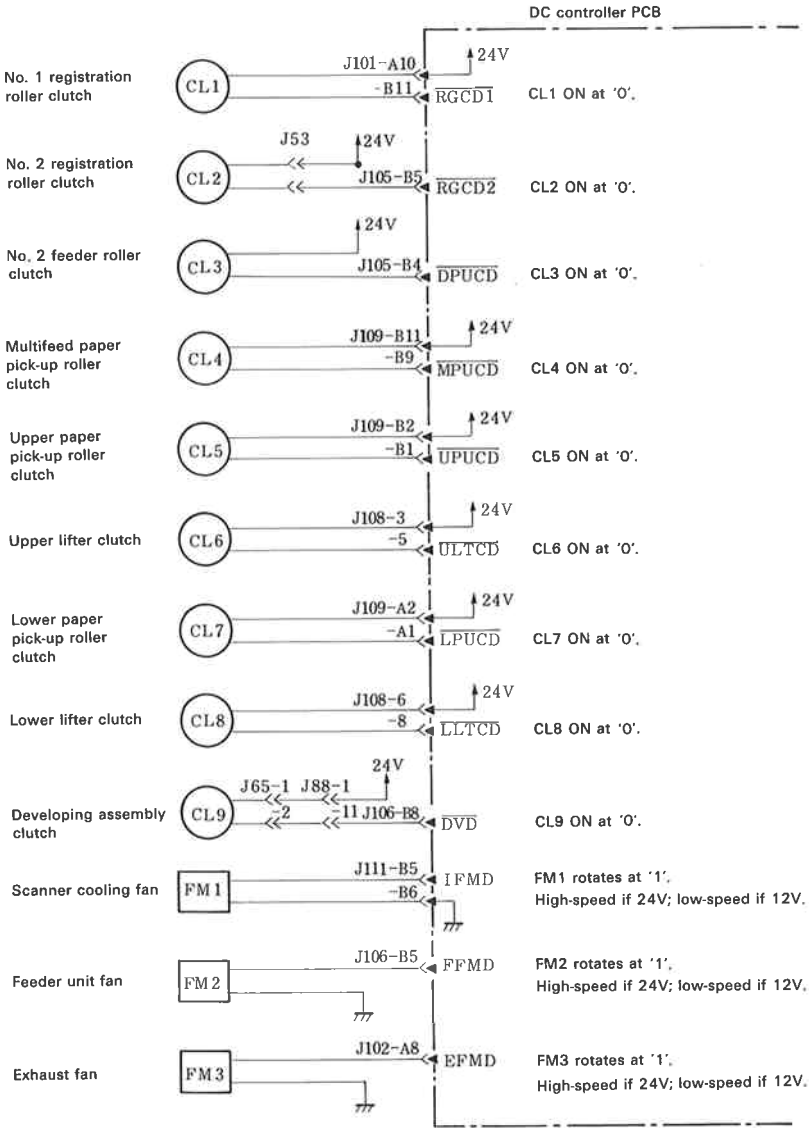

Figure 3-10

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3. Output from the DC Controller PCB (3/5)

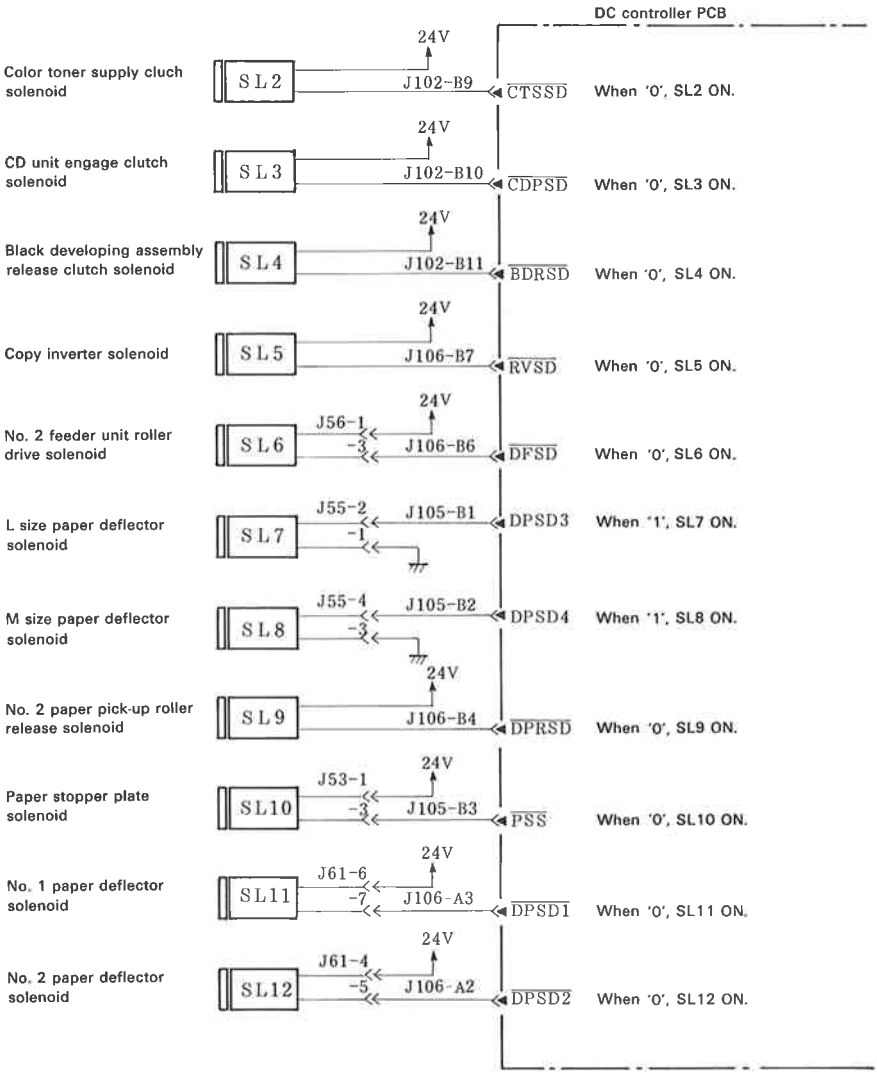

Figure 3-11

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4. Output from the DC Controller PCB (4/5)

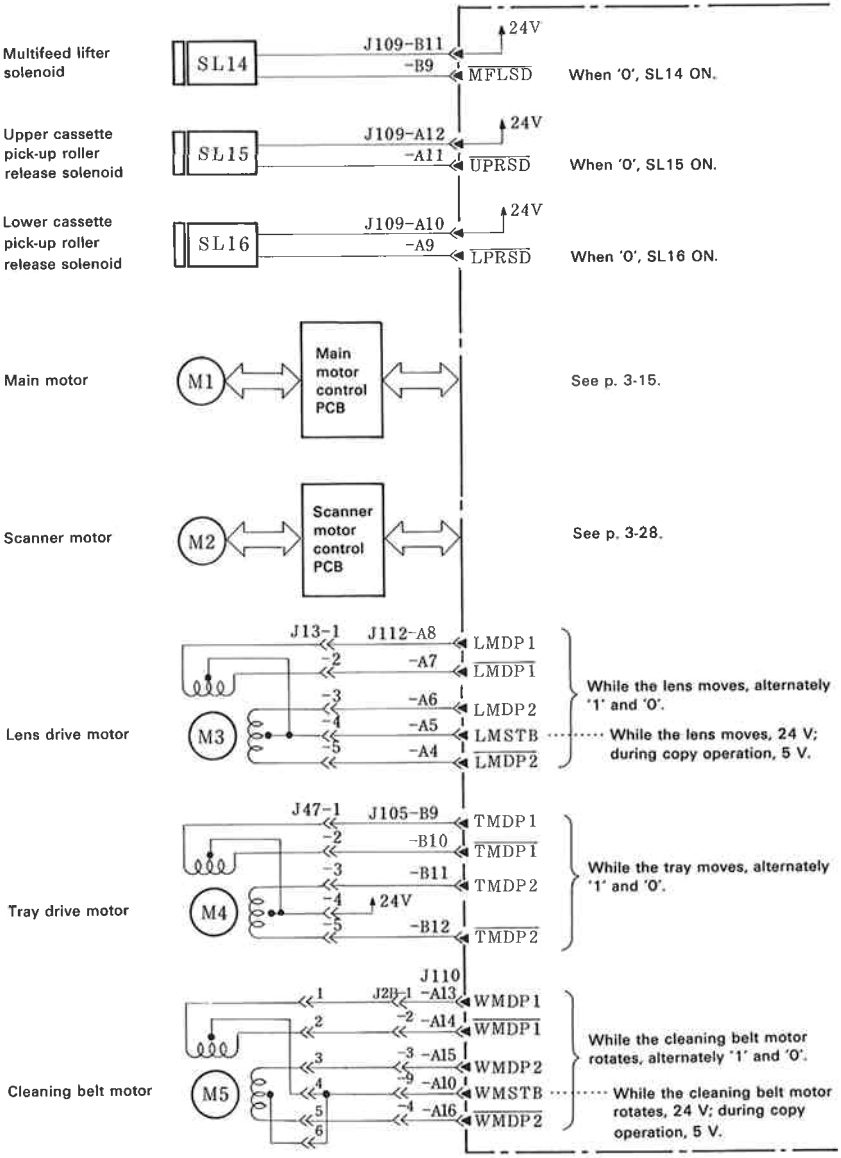

Figure 3-12

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5. Output from the DC Controller PCB (5/5)

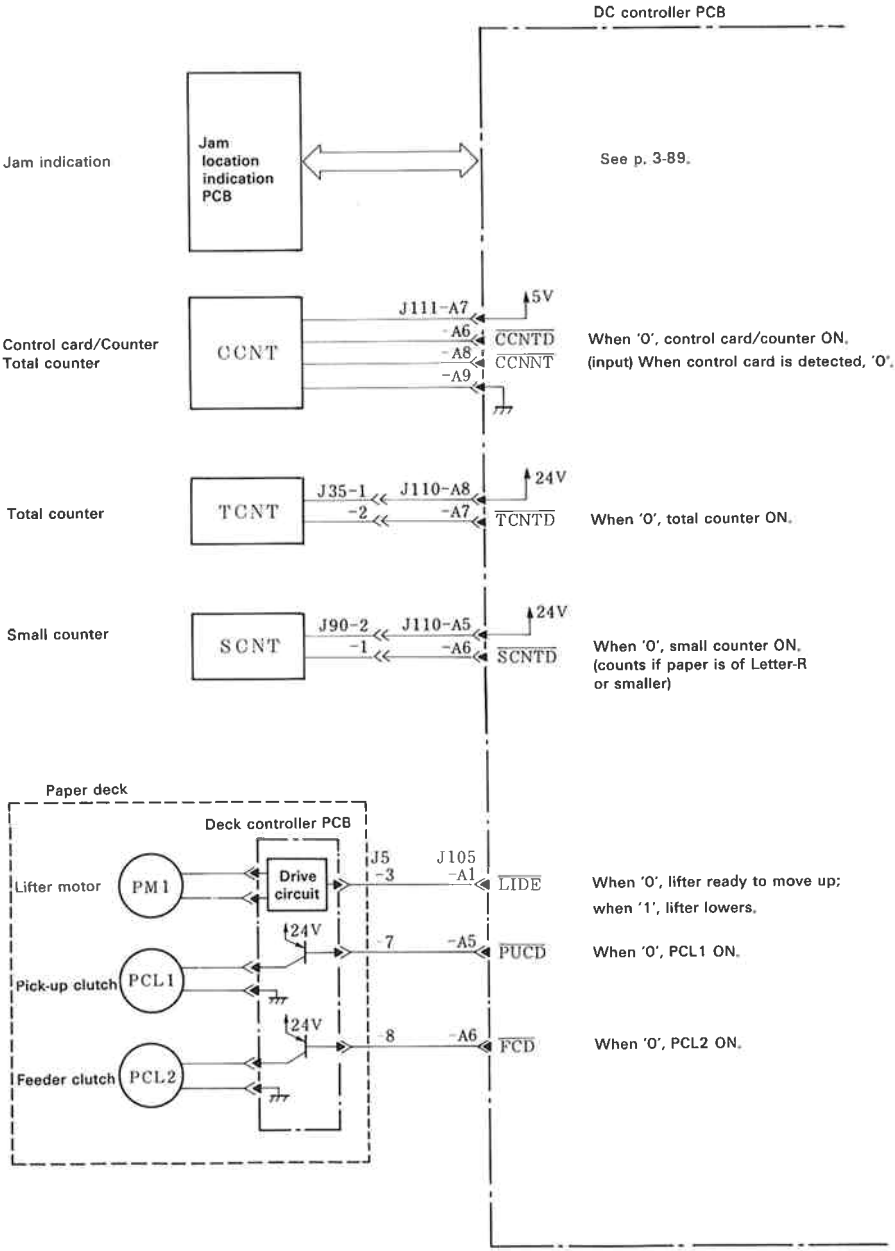

Figure 3-13

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E. Main Motor Control Circuit

1. Outline

Figure 3-14 shows the circuit which controls the main motor. The major functions of the circuit are as follows:

① Turns main motor ON and OFF
② Shifts main motor speed
③ Controls main motor rotation speed

The main motor is a DC motor with a built-in clock pulse generator. The rotation of the main motor generates clock pulses (MMCLK) which correspond to the number of revolutions. The speed control circuit uses these clock pulses to control the rotation speed of the motor.

These clock pulses are divided into units of 1/20 and sent to the DC controller PCB as clock pulses (CLKP) for sequence control.

2. Operations

The drive circuit goes ON when the main motor drive command ($\overline{MMD}$) goes '0', causing the main motor to start.

The speed of the main motor is controlled by the main motor speed control signal (MMSC) from the DC controller PCB.

As shown in Table 3-1, the main motor speed control signal is changed to suit the copy mode.

Mode	Speed
Reproduction ratio 200% to 90%	High speed
Reproduction ratio 89% to 50%; Overlay or Color copy	Low speed

Table 3-1

The speed control circuit on the main motor driver PCB compares the main motor speed control signal and the clock pulses (MMCLK) from the main motor, and sends control signals to the drive circuit so as to keep the two signals the same at all times.

The drive circuit of the motor controls the rotation speed by varying the ON/OFF timing of the power supply to the motor rather than by changing the voltage, which is kept constant.

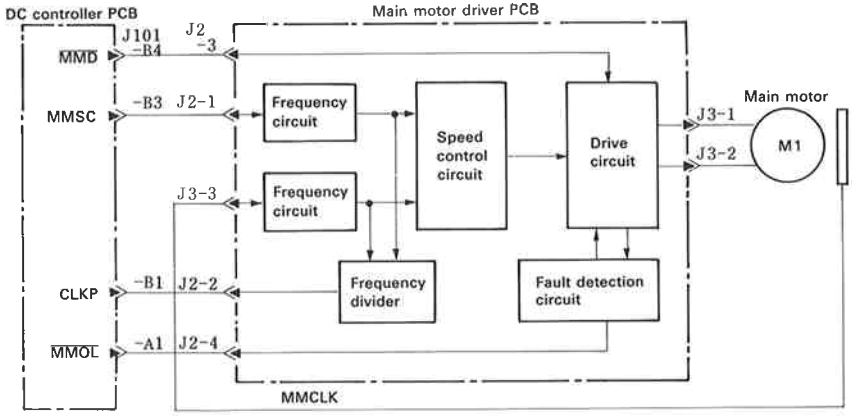

Figure 3-14

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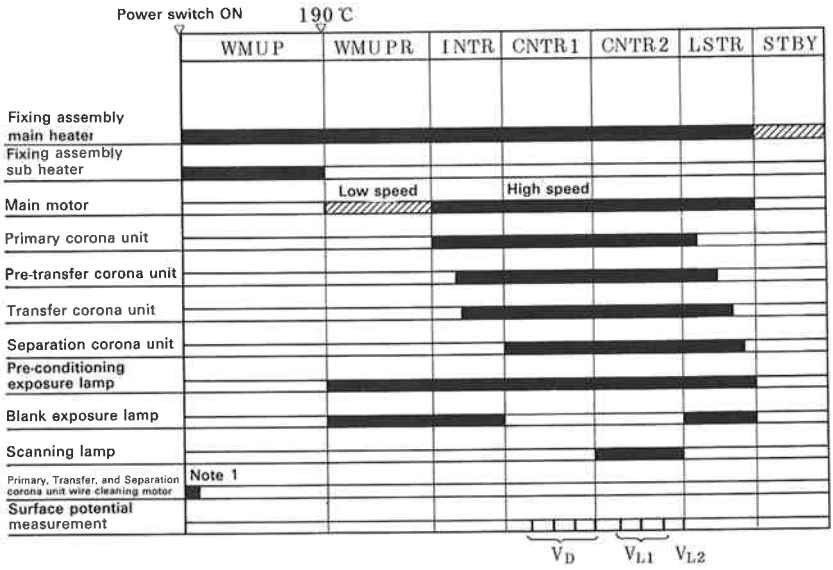
F. Basic Sequence

1. Sequence upon Power ON



Note 1: If the temperature of the fixing assembly is 160°C or less when the power switch is turned ON, the primary, transfer, and separation corona unit wires are cleaned.

Figure 3-15

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Period		Purpose	Remarks
WMUP (warm-up)	From when the power switch is turned ON until the surface temperature of the fixing assembly upper roller reaches 190°C.	• Waits until the fixing assembly warms up.	• If the temperature of the roller is 160°C or less when the power switch is turned ON, the primary, separation, and transfer corona unit wires are cleaned. • While the lens moves to the DIRECT position.
WMUPR (warm-up rotation)	While the drum makes 3 rotations.	• Evens out the surface temperature of the fixing assembly rollers. • Delivers copy paper, if any.	• The main motor rotates at low speed. • The warm-up rotation is performed even if the surface temperature of the fixing assembly upper roller is 190° or more.
INTR (initial rotation)	While the drum makes a single rotation.	Rotates the drum at high speed to stabilize the drum sensitivity in preparation for copy operation.	
CNTR1 (control rotation 1)	For about 2 sec after end of INTR.	Controls the drum surface potential (V_D).	
CNTR2 (control rotation 2)	For about 2.6 sec after end of CNTR1.	Controls the drum surface potential (V_L).	Determines the developing bias (DC component) to suit the measurement of V_{L2}.
LSTR (last rotation)	While the drum makes a single rotation.	Neutralizes the potential on the drum surface as the last process.	
STBY	After end of LSTR until the COPY START key is turned ON or the power switch is turned OFF.	• Waits until any of the operation keys (COPY START, etc.) is pressed.	The indications on the control panel returns to the standard mode 2 min after end of LSTR.

Table 3-2

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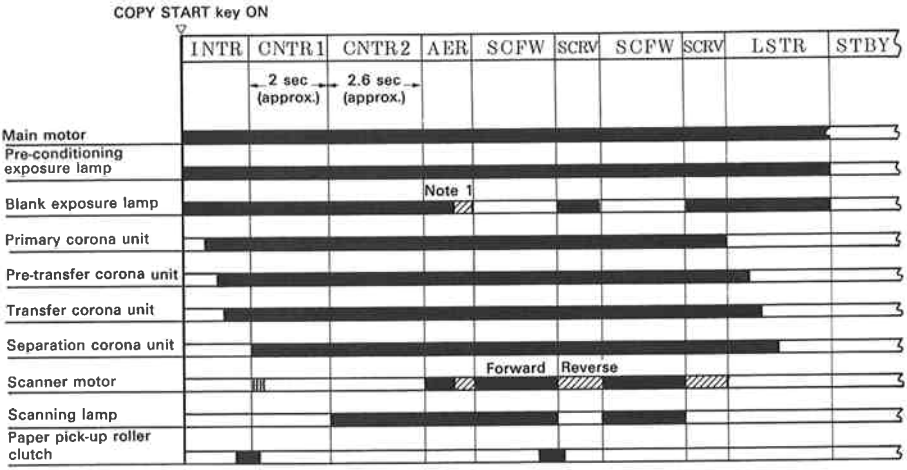
2. Sequence During Copy Operation



Note 1: Lamps over sections of potential sensors go out.

Figure 3-16

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Period		Purpose	Remarks
INTR (initial rotation)	From the COPY START key is turned ON until beginning of CNTR 1.	Stabilizes the drum sensitivity in preparation for copy operation.	● Moves the lens. If the lens fails to reach the specified position within the specified time, INTR is continued until the lens movement is complete.
CNTR1 (control rotation 1)	For about 2 sec after end of INTR.	Controls the drum surface potential (V_D).	Rotates the scanner motor in reverse before potential control to return the scanner to its home position.
CNTR 2 (control rotation 2)	For about 2.6 sec after end of CNTR1.	Controls the drum surface potential (V_L).	Determines the developing bias (DC component) for copy operation to suit the measurement of V_{L2}.
AER (AE rotation)	While the scanner moves about 150 mm to return to its home position.	Measures the document density while the scanner moves in reverse.	● Control is when in the AE mode only.
SCFW (scanner forward)	While the scanner moves forward. ● The distance moved forward depends on the cassette size and reproduction ratio. ● The speed of forward movement depends on the reproduction ratio.	The scanning lamp exposes the document, and the reflected optical image is projected on the drum through mirrors and lenses.	● The registration signal is generated to feed the copy paper to the transfer area . ● The paper pick-up signal is generated to pick up the second copy paper.
SCRV (scanner reverse)	While the scanner moves in reverse.	● Returns the scanner to its home position in preparation for the next copy operation.	
LSTR (last rotation)	From end of SCRV until the main motor stops.	Neutralizes the potential on the drum surface as the last process.	Delivers the last copy paper.

Table 3-3

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3. Basic Sequence When Copying by Page Separation

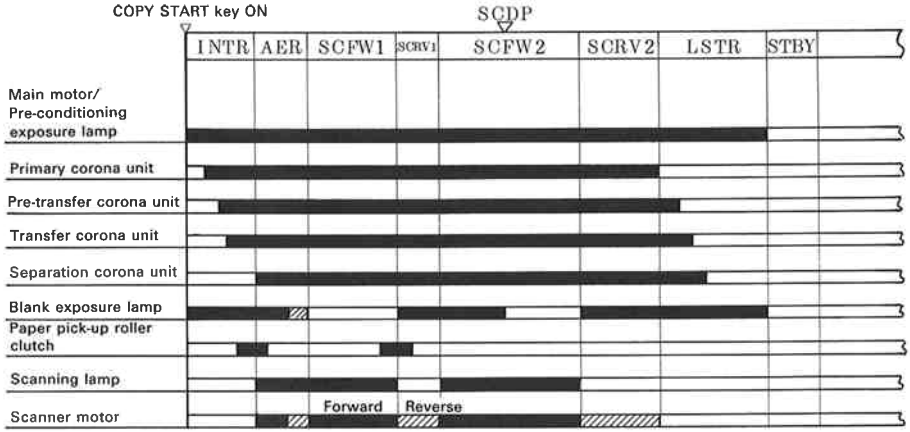

Figure 3-17

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Period		Purpose	Remarks
SCFW 1 (scanner forward 1) (document on left copied)	While the scanner moves forward. ● The distance moved forward depends on the document and cassette size, and reproduction ratio.	The scanning lamp exposes the document on the left, and the reflected optical image is projected on the drum through mirrors and lenses.	● The registration roller clutch drive command is generated to feed the copy paper to the transfer area. ● The paper pick-up signal is generated to pick up the next copy paper.
SCRV1 (scanner reverse 1)	From when the scanner moves in reverse until the copy paper is delivered.	● Returns the scanner to its home position in preparation for the next copy operation. ● Transfers the toner from the drum to the copy paper.	
SCFW2 (scanner forward 2) (document on right copied)	While the scanner moves forward. ● The distance moved forward depends on the document and cassette size, and reproduction ratio. ● The speed of forward movement depends on the reproduction ratio.	The scanning lamp exposes the document on the right, and the reflected optical image is projected on the drum through mirrors and lenses.	● The registration signal is generated so that the leading edge of the document image on the right and the copy paper match with reference to the SCDP roller clutch command.
SCRV (scanner reverse 2)	From when the scanner moves in reverse until the developing assembly clutch is turned OFF.	● Returns the scanner to its home position in preparation for the next copy operation. ● Transfers the toner from the drum to the copy paper.	

Note:
For copy sequence other than the above, see Table 3-3.

Table 3-4

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II. EXPOSURE SYSTEM

A. Changing the Reproduction Ratio

The reproduction ratio across the drum is changed by the work of the lens drive system and that around the drum, by the scanner drive system.

To change the reproduction ratio across the drum, the lens drive system changes the position (focus point) of the lens as shown in Figure 3-18.

To change the reproduction ratio around the drum, the scanner drive system changes the speed of the movement of mirror 1 in relation to the peripheral speed of the drum; i.e., faster for reduction, and slower for enlargement.

1. For the copier, mirror-to-mirror relocation is not used to change reproduction ratios.
2. In the direct copy mode, the speed of mirror 1 is identical to the peripheral speed of the drum.

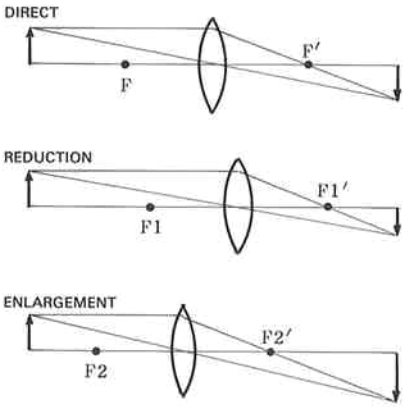

Figure 3-18

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B. Lens Drive System

1. Outline

The lens is driven by the lens drive motor (M3). When the power switch is turned ON, the motor always rotates in reverse and moves the lens to the point where the signal plate shown in Figure 3-19 blocks the lens home position sensor.

When the lens reaches its home position, the motor shifts to normal rotation. After the signal plate leaves the sensor and so many pulses have been generated, the motor stops, and the lens is set for the direct copy mode.

To move the lens for larger ratios, i.e., from reduction to direct copy, the motor rotates in reverse first, and the lens is moved once past the position corresponding to the ratio selected. The motor then shifts to normal rotation to position the lens corresponding to the ratio selected. This way, the lens is positioned with higher accuracy than if stopped with the motor rotating in reverse.

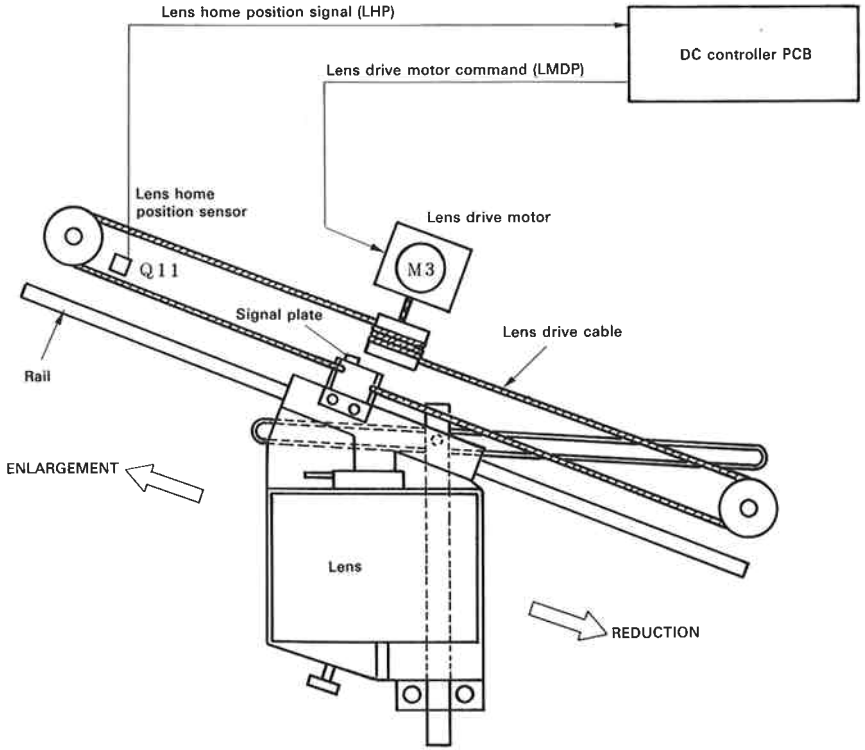

Figure 3-19

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C. Scanner Drive System

1. Outline

The scanner is moved forward or in reverse by changing the direction of the scanner motor (M2) rotation.

When the scanner moves forward, the rotation speed of the scanner motor varies depending on the reproduction ratio.

When the scanner moves in reverse, the rotation speed of the scanner motor is constant at 3.6 times (see Note) the speed of when the scanner moves forward in the direct copy mode.

The brakes are applied as soon as the signal plate reaches the photointerrupter (Q13) to slow down the scanner; the brakes are applied once again when the signal plate reaches the photointerrupter (Q14) to stop the scanner at its home position.

The distance over which the scanner moves depends on the copy paper size and reproduction ratio.

Note:
When the RDF/D-ADF is used and in the AE mode, the scanner takes AE measurements when moving in reverse; at this time, the movement is about two times faster than when the scanner moves forward in the direct copy mode.

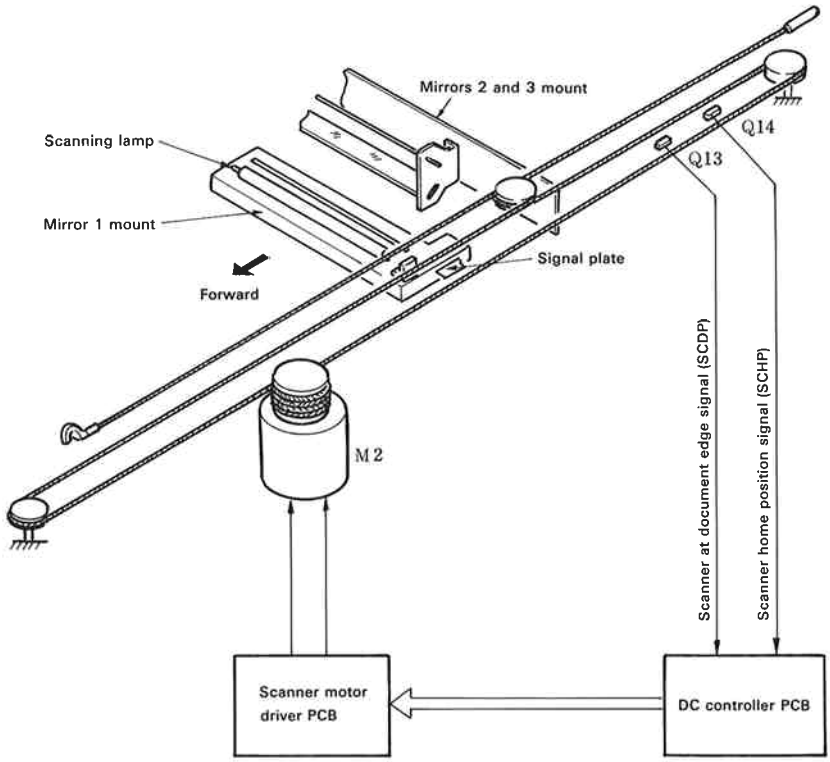

Figure 3-20

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2. Relationship Between Scanner Sensors and Signals

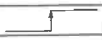
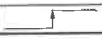
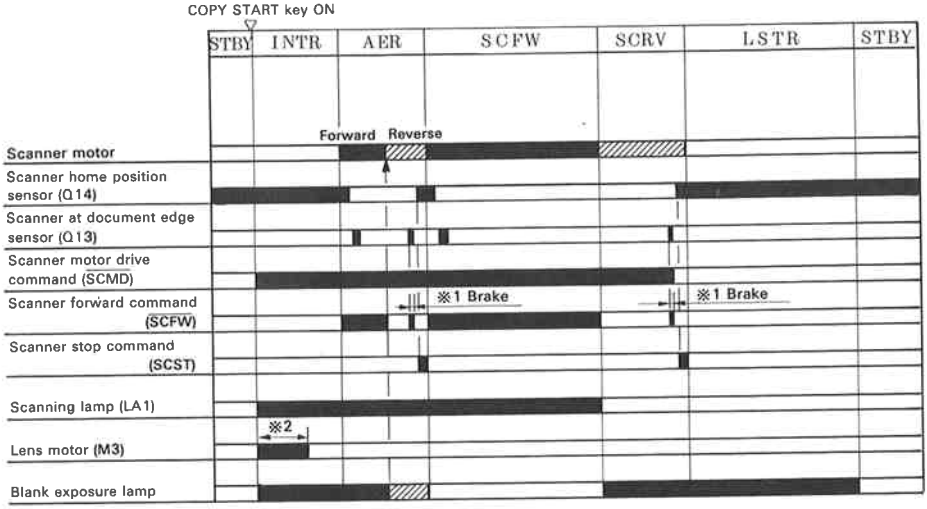
Scanner sensor	Signal	Scanner		Remarks
		Forward	Reverse	
Q14	SCHP			• Scanner home position
				• Scanner stop brake ON
Q13	SCDP			• Registration roller cluch ON • Scanner forward distance reference
				• Scanner speed-down brake ON

Table 3-5

3. Basic Operation Sequence for Scanner

The distance over which the scanner moves forward is controlled by the microprocessor and is determined to suit the copy paper size, reproduction ratio, and copy mode.

The microprocessor, based on the reproduction ratio selected, calculates the size of the copy paper which can accommodate the document in determining the distance.



※1 Variable in the service mode.

※2 Moves lens to suit reproduction ratio.
If not specified, no lens movement.

Figure 3-21

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4. Scanner Operations during Page Separation

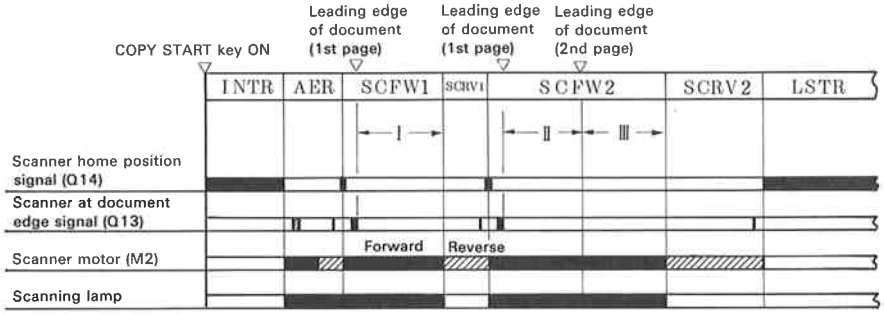

Figure 3-22

Periods I, II, and III in Figure 3-22 are controlled by the microprocessor on the DC controller PCB. The control is based on the falling edge of the scanner at document edge signal (SCDP).

The microprocessor determines the distance over which the scanner moves in relation to the document size or the cassette size selected.

I and II:

The distance over which the scanner moves is determined by the reproduction ratio and document size or cassette size.

III:

When the document size is detected, the microprocessor recognizes the value half that of the document size detected as the center of the document.

The scanner moves with reference to the center serving as the leading edge of the second page.

Page separation without detection of the document size is based on the cassette size.

If the forward distance represented by II in Figure 3-22 exceeds 220 mm (approx.), 220 mm will be used to represent the leading edge of the second page.

Reversing the copy priority over the 1st and 2nd pages using the asterisk mode (CHAPTER 1) merely reverses SCFW2/SCRV2 and SCFW1/SCRV1.

Note:
The scanner is controlled based on the minimum document size detected if two or more modes are selected.
The document size is used as reference by the microprocessor when the following modes are selected.

Selection of the following modes results in control by the microprocessor based on the document size.

Mode	Document size for reference
● Feeder (RDF, D-ADF) in use	Document size detected by feeder
● Document frame erasing mode ● Book frame erasing mode	Document size specified by user
● Automatic reproduction ratio selection ● Automatic paper size selection	Document size detected by copier

Table 3-6

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5. Scanner Motor Control Circuit

a. Outline

Figure 3-23 shows the circuit which controls the scanner motor. The functions of the circuit are as follows:

① Turns scanner motor ON and OFF
② Controls direction of scanner motor rotation
③ Controls speed of scanner motor rotation

b. Scanner Motor OFF

When the scanner motor drive command (SCMD) goes '1', the drive circuit goes OFF and the motor does not rotate.

c. Scanner Forward Control

When the scanner motor drive command (SCMD) goes '0' and the scanner forward command (SCFW) goes '0', the drive circuit goes ON and the scanner motor rotates in normal direction, moving the scanner forward.

d. Scanner Reverse Control

When the scanner motor drive command (SCMD) goes '0' and the scanner forward command (SCFW) goes '1', the drive circuit goes ON and the scanner motor rotates in reverse direction.

e. Scanner Motor Rotation Speed Control

The microprocessor on the DC controller PCB sends the scanner speed command (SCS) which corresponds to the reproduction ratio selected to the scanner motor driver PCB. The rotation speed control circuit compares the scanner speed signal and the clock pulses (SCMCLK) from the scanner motor and sends control signals suitable to the difference to the motor drive circuit.

The drive circuit of the motor controls the rotation speed by varying the ON/OFF timing of the power supply to the motor rather than by changing the voltage, which is kept constant.

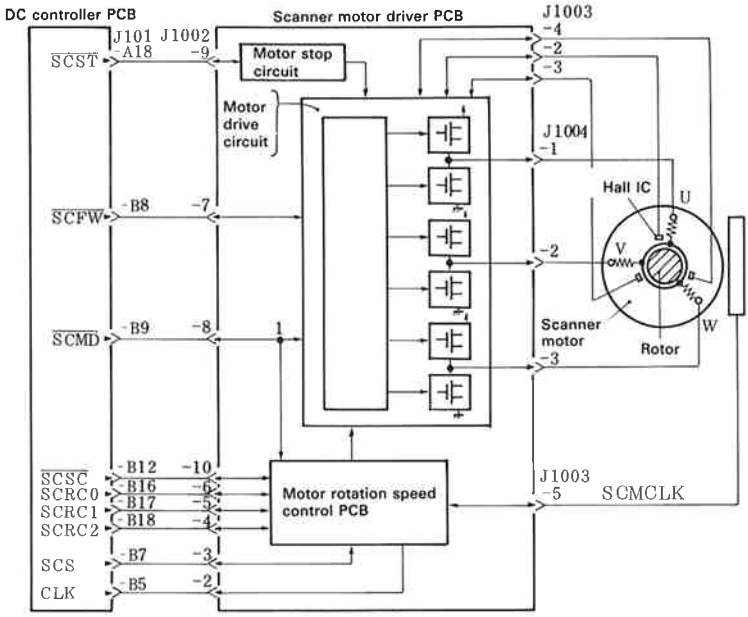

Figure 3-23

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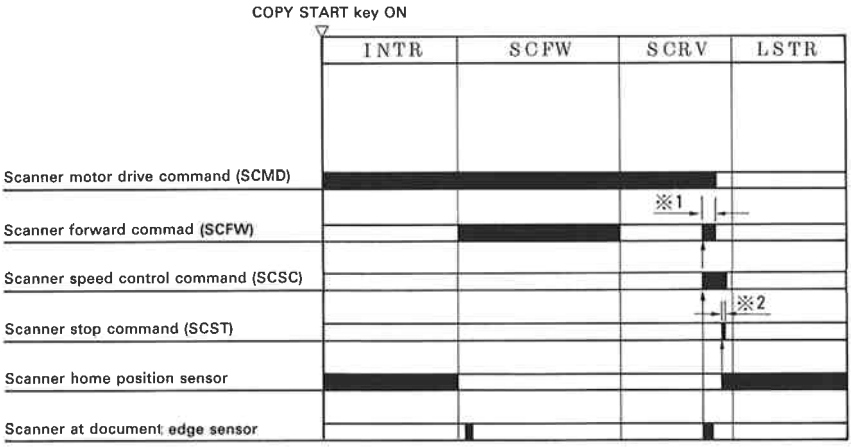
To vary the rotation speed of the scanner motor to suit the reproduction ratio, the DC controller PCB sends the reproduction ratio select commands (SCRC 1 and 2) as shown in Table 3-7.

SCRC2	SCRC1	SCRC1	Main motor at high speed	Main motor at low speed	Overlay copy, color copy
0	0	0			200% ~ 165%
0	0	1	200% ~ 168%		164% ~ 135%
0	1	0	167% ~ 137%		134% ~ 110%
0	1	1	136% ~ 112%		109% ~ 90%
1	0	0	111% ~ 93%	89% ~ 75%	89% ~ 75%
1	0	1	92% ~ 90%	74% ~ 60%	74% ~ 60%
1	1	0		59% ~ 50%	59% ~ 50%
1	1	1	Scanner reverse		

Table 3-7



※1 Scanner speed-down brake.
※2 Scanner stop brake.

Figure 3-24

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D. Document Size Detection Control

1. Outline

The copier selects copy paper size as well as changes reproduction ratios automatically, and these capabilities are effected based on the size of the document to be copied.

For detection of the document size, three document detection circuits are provided at the points shown in Figure 3-25. These circuits detect the presence of a document when the copyboard cover is closed, and the DC controller PCB decides its size in terms of Ledger (11" × 17"), Ledger, Letter, or Mini-R (standard sizes).

The LEDs are turned ON by the document detection circuits, and the light from the LEDs illuminates the document, if any. The light reflected by the document is detected by phototransistors, which inform the DC controller PCB of the presence or absence of a document in the form of signals.

When the copyboard cover is brought down to about 30° or less, the microswitch (MS3) is turned ON for detection of the document size.

2. Document Size Detection

The DC controller PCB detects the size of documents based on combinations of states the document detection circuits are in as shown in Table 3-8.

No.	Document size	Document detection circuit		
		1	2	0
1	11"×17"	ON	ON	ON
2	LEGAL	OFF	ON	ON
3	LETTER	ON	OFF	OFF
4	LETTER-R	OFF	OFF	ON
5	MINI-R	OFF	OFF	OFF

ON: Detects presence of document.
OFF: Detects absence of document.

Table 3-8

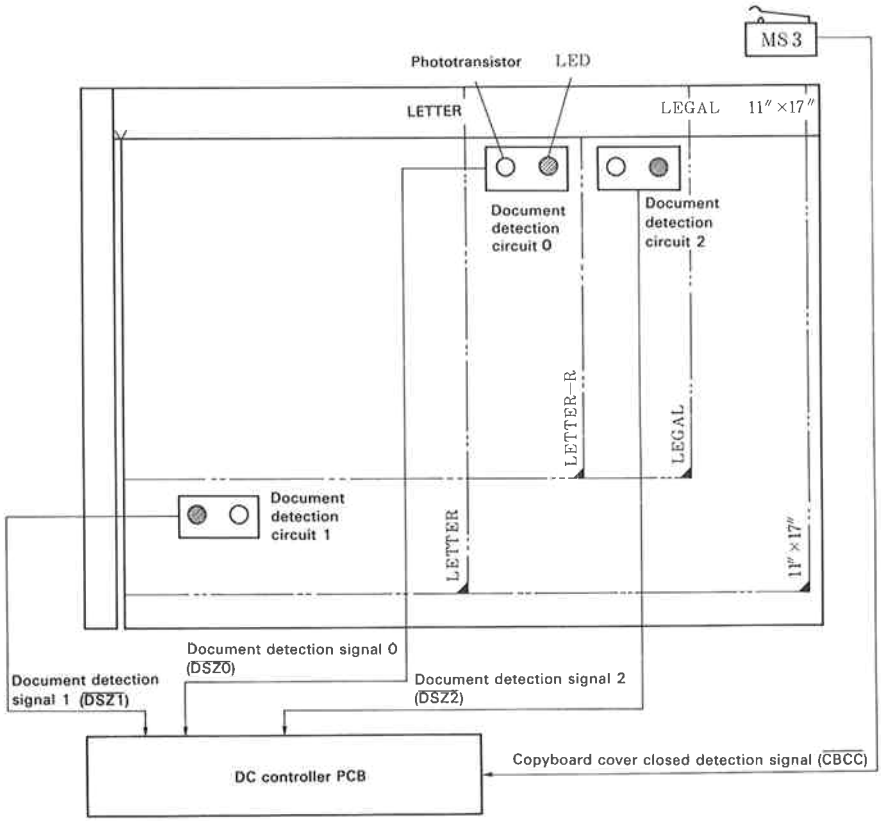

Figure 3-25

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III. IMAGE FORMATION SYSTEM

A. Drum Surface Potential Control

1. Outline

Copy quality is dependent on electrostatic latent images. The electrostatic latent images, in turn, are affected by the following:

① Variation in drum sensitivity
② Variation in discharge from primary corona
③ Variation in exposure

Such variation is due to the environment in which the copier is operated (temperature, humidity, etc.), deterioration of parts, and others.

In order to maintain stable electrostatic images as much as possible in the presence of these factors, the copier is provided with a drum surface potential control mechanism.

Specifically, the light area target potential (V_{L1}) and dark area target potential (V_D) are varied to enable formation of the best images.

Note:
Adjust the light area target potential and dark area target potential according to the Instruction Sheet, which comes with the drum. The adjustment is performed only when the drum is replaced.

2. Control Method

Table 3-9 shows the number of measurements taken and corrections made for control of the potential.

	Measurement taken	Corrections made
V_D	4	4
V_{L1}	3	3
V_{L2}	1	0

Table 3-9

The black developing assembly is disengaged while potential control takes place.

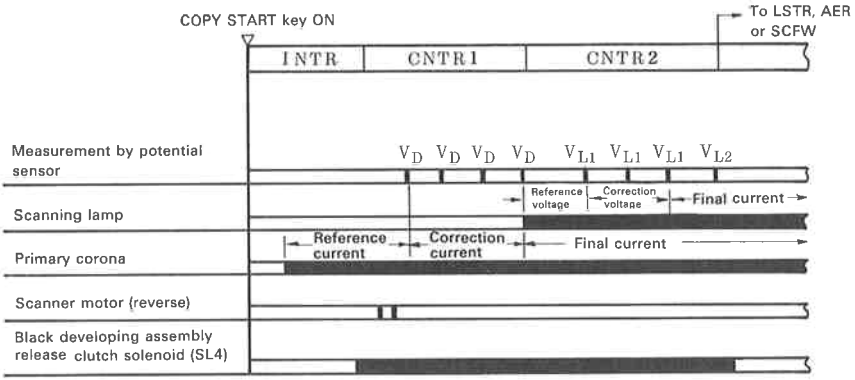

Figure 3-26

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a. Primary Current Control

The purpose of the primary current control is to bring the dark area potential (V_D) closer to the target potential.

To correct the V_D, the reference current is applied to the primary corona unit, and the surface potential of the drum is measured by a sensor.

The DC controller PCB then compares the value so measured against the target value and, if the former deviates from the latter, sends the primary corona level control command (HVTPC) after correcting its value.

This mechanism corrects the current applied to the primary corona so that the dark area potential (V_D) is brought closer to the target value.

The copier performs this measurement/correction four times.

b. Controlling the Scanning Lamp Intensity

The intensity of the scanning lamp is controlled so as to bring the light area potential (V_{L1}) closer to the target value.

The light area potential (V_{L1}) is the value of the potential on the area of the drum to which light reflected from the standard white plate is projected. The standard white plate is exposed by the scanning lamp.

To correct V_{L1}, the reference ON voltage is applied to the scanning lamp, and the potential on the surface of the drum at the time is measured. The DC controller PCB then compares the value so measured against the target value and, if the former deviates from the latter, sends the light intensity control command (LINT) after correcting its value.

This mechanism corrects the voltage applied to the scanning lamp so that the light area potential is brought closer to the target value.

The copier performs this measurement/correction three times.

c. Controlling the Developing Bias

The developing bias is controlled based on the light area potential (V_{L2}) so as to determine the DC bias applied to the developing bias.

For V_{L2}, the scanning lamp is turned ON based on the last intensity control command value used in controlling V_{L1}, and the surface potential of the drum is measured.

The DC controller PCB uses the potential so measured to control the developing bias DC level control command (HVBDC), which in turn controls the DC bias applied to the developing cylinder by the high-voltage transformer.

Reproduction ratio	Power ON to less than 10 min	10 min to less than 60 min	60 min or more
90 % to 200 %	Once per power ON	Once at 1st copy regardless of reproduction ratio	Once at 1st copy regardless of reproduction ratio
50 % to 89 %	Once at 1st copy regardless of reproduction ratio	Once at 1st copy regardless of reproduction ratio	Once at 1st copy regardless of reproduction ratio

Table 3-10

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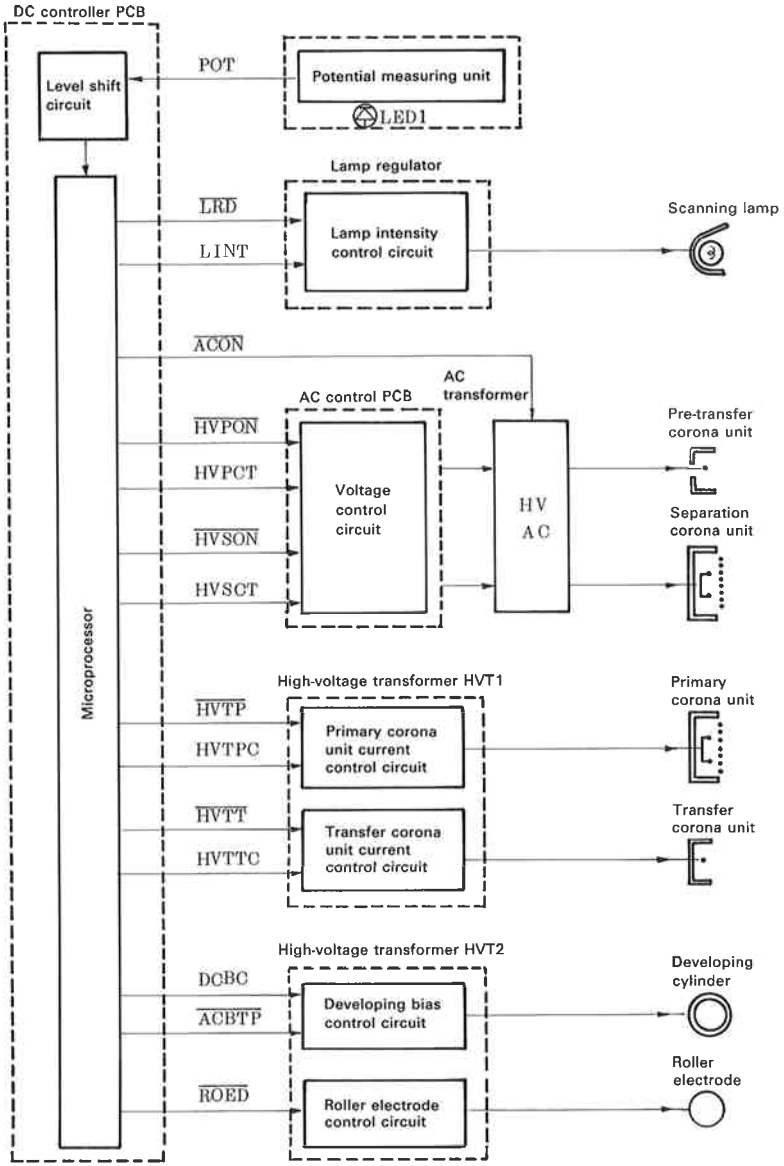

Figure 3-27 Surface Potential Control

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d. Potential Control Conditions

The potential control (by CNTR1 and 2) is performed not for each copy but according to the following conditions:

Figure 3-31 is a block diagram of the circuit used for detection of the potential.

A charge equivalent to the surface potential of the drum is induced on the electrode inside the sensor by the work of charges on the drum. The charge turns into AC voltage as the chopper opens and closes and is sent to the pre-amplifier inside the sensor and amplified. After amplification, it is then sent to the filter/gain adjustment circuit on the surface potential measuring PCB.

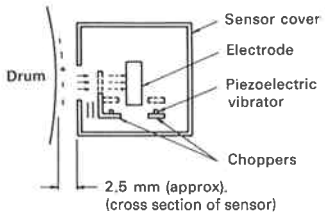

Figure 3-28

In the filter/gain adjustment circuit, the AC signal from the pre-amplifier of the sensor is rid of electrical noise and is further amplified. After amplification, it is sent to the sync-clamp circuit through the photocoupler.

The sync-clamp circuit combines the AC signal from the filter/gain adjustment circuit and the synchronization signal from the synchronization signal adjustment circuit and determines whether the surface potential of the drum is positive or negative.

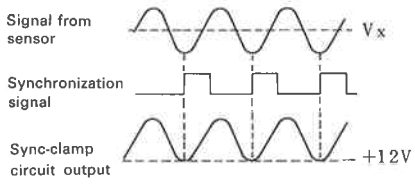

Figure 3-29 (surface potential higher than sensor bias)

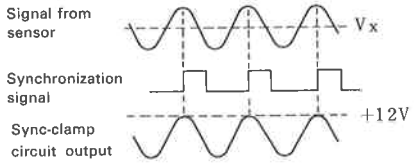

Figure 3-30 (surface potential lower than sensor bias)

The output of the sync-clamp circuit is integrated in the integration circuit and applied to the transformer after amplification. In keeping with the signal, the output of the transformer varies between 0 V and +600 V and is applied to the sensor as a sensor bias and, at the same time, is lowered to about 1/300 and applied to the level shift circuit inside the DC controller PCB.

The output of the level shift circuit (analog) is sent to the microprocessor on the DC controller PCB as it is.

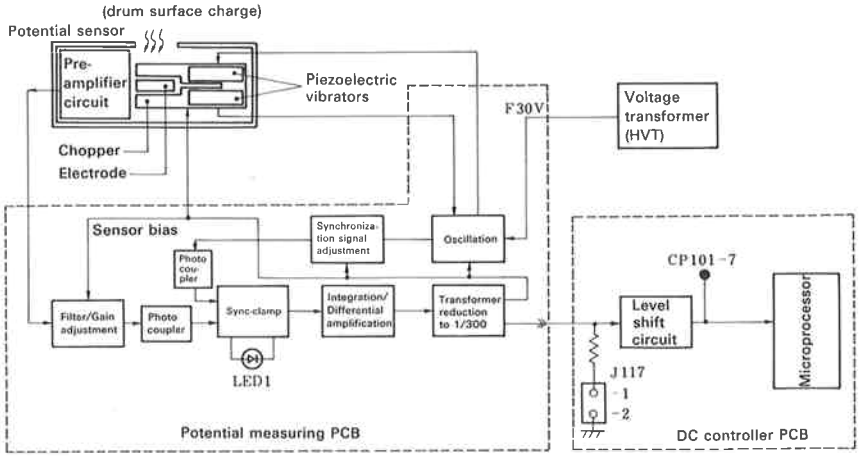

Figure 3-31

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e. Checks

① LED 1 ON (potential measuring PCB)
Normally, LED 1 goes ON when the main motor rotates.
If it fails to go ON, F30V may be out of supply or the potential measuring unit may be faulty.

Note:
The potential sensor is normal as long as LED 1 is ON.

② Check Pins
- Use J117-1 and J117-2 on the DC controller PCB to check if the potential measuring unit is normal or otherwise. (For details, see "Zero Level Check" in the SERVICE HANDBOOK.)

Note:
The sensor and potential measuring PCB need to be adjusted in combination and with precision. As such adjustment is not possible in the field; they are referred to as a single unit and called "potential measuring unit."

The potential measuring PCB is provided with a variable resistor. Do not adjust it in the field.

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4. Controlling the Scanning Lamp Intensity

a. Outline

Figure 3-32 shows the circuit which controls the intensity of the scanning lamp. Its functions are as follows:

① Turns scanning lamp ON and OFF
② Controls intensity of scanning lamp
- Maintains intensity constant against fluctuations in power voltage
- Controls intensity in keeping with shifts in drum sensitivity
- Controls intensity in keeping with settings made by COPY DENSITY keys
- Controls intensity in keeping with document density (AE control)

b. Operations

① Turning the Scanning Lamp ON and OFF

When the lamp regulator drive command ($\overline{\text{LRD}}$) of the scanning lamp goes '1', the output of the lamp regulator switch circuit goes '0', and the phase control circuit is deprived of power. This causes the triac triggering circuit to go OFF, causing the scanning lamp (LA1) to go OFF.

When $\overline{\text{LRD}}$ goes '0', the output of the lamp regulator switch circuit goes '1'. The phase control circuit is supplied with 24V power and the triac triggering circuit goes ON, causing the scanning lamp (LA1) to go ON.

② Controlling the Intensity of the Scanning Lamp

The intensity of the scanning lamp is increased or decreased by controlling the supply voltage to the scanning lamp in keeping with the value of the intensity control command (LINT) from the DC controller PCB.

LINT varies between 10 V and 16 V in response to the settings by the COPY DENSITY keys or the document density, drum sensitivity, and settings by the light intensity control VR. The signal phase-controls the supply voltage to the scanning lamp so that it varies between 45 V and 80 V.

In the photo mode, the voltage applied to the scanning lamp is lowered from that in the regular copy mode, thereby decreasing the intensity of light projected on the document surface.

200% to 90% ..... lowered by 6 V
89% to 50% ..... lowered by 5.4 V

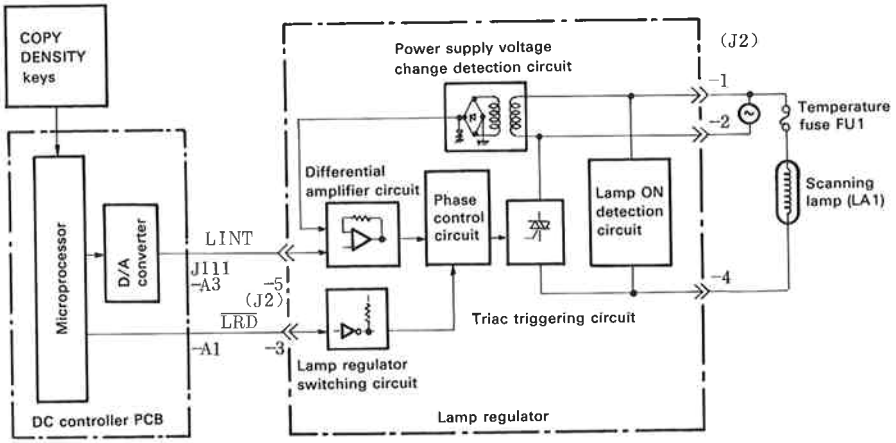

Figure 3-32

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c. Automatic Exposure Control (AE)

① Outline

The copier is provided with an automatic exposure mechanism which controls the intensity of the scanning lamp automatically to suit the density of the document.

In the automatic exposure (AE) mode, the copy density need not be adjusted manually to obtain copies free of fogging. The lamp intensity in the AE mode is indicated on the COPY DENSITY display of the control panel.

② Control Method

While AE rotation (AER) is in effect, the scanner is moved forward 150 mm, and the document is exposed when it is moved in reverse at an intensity equivalent to '5' of the density indication.

While the document is exposed, the surface potential of the 23 points shown in Figure 3-33 is measured, and the measurements are sent to the DC controller PCB.

The DC controller PCB calculates an average over the surface potential values and determines the intensity of the scanning lamp for copy operation.

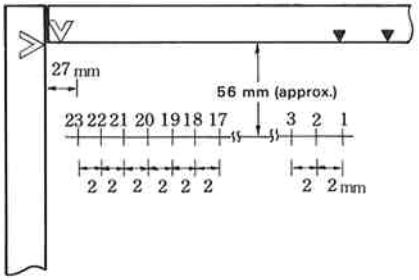

Figure 3-33 (DIRECT)

If an RDF-II or D-ADF is used, the first document is exposed when the scanner is moved forward and the next document is exposed when the scanner is moved in reverse for AE operation; this mechanism is called "feeder AE."

Since the document density is measured while the document is fed to the copyboard glass in feeder AE, the points at which the document density is measured are reduced to eight. Although it is possible to change to 23-point measurement in the service mode, copying will slow down since such change result in regular AE.

Feeder AE is limited to the following conditions:

- Reproduction ratio of 100% to 156%
- Black copy
- One-sided copy (document and copy paper sizes must be the same)

Figure 3-34 shows changes in the intensity of the scanning lamp in relation to the changes in the surface potential (document density). If the document density is higher than the Test Sheet but lower than a newspaper, the intensity of the scanning lamp varies between 5 and 9 in terms of the density indication. If the document is lighter than the Test Sheet, the intensity will be an equivalent of 5; and if darker than a newspaper, the intensity will be an equivalent of 8.

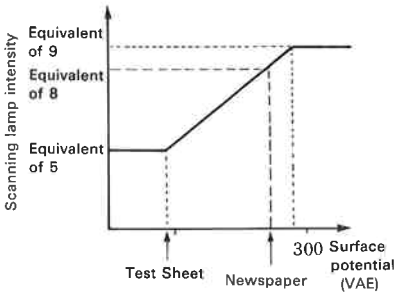

Figure 3-34

d. Checks

① Voltage of J110-A3 ($\overline{\text{LRD}}$)

Check that the voltage between J110-B16 (GND) and J110-A3 ($\overline{\text{LRD}}$) on the DC controller PCB is about 0 V when the scanner moves forward and about 9 V when it moves in reverse or when in initial and last rotation.

If the voltage measured does not vary as above, the DC controller PCB may be faulty.

② Voltage of J110-A1 (LINT)

Check that J110-A1 (LINT) and J110-B16 (GND) on the DC controller PCB is about 10 V to 16 V during copy operation and the voltage changes upon each press on the COPY DENSITY key.

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e. Exposure Intensity Adjustment and AE Adjustment

Table 3-11 is a list of items that can be adjusted on the scanning lamp intensity adjustment circuit.

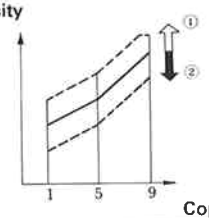
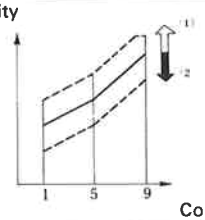
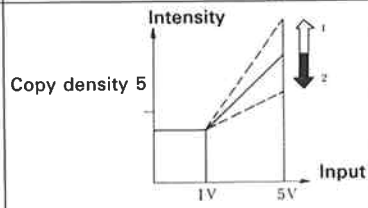
Service mode	Purpose	Description	Remarks
☒3☒ VR106 COLOR	Optimum exposure at time of potential control (intensity adjustment for copy density 5)	Intensity  	1) Setting in the service mode is increased. Intensity during copy operation increases, and copy density lowers. 2) Setting in the service mode is decreased. Intensity during copy operation decreases, and copy density rises.
☒3☒ VR107	Optimum exposure at time of no potential control (intensity adjustment for copy density 5)	Intensity  	1) Setting in the service mode is increased. Intensity during copy operation increases, and copy density lowers. 2) Setting in the service mode is decreased. Intensity during copy operation decreases, and copy density rises.
☒3☒ VR103	Slope of AE control system	 	1) Setting in the adjustment mode is decreased. Copy density of newspapers decreases. 2) Setting in the adjustment mode is increased. Copy density of newspapers increases.

Table 3-11

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5. Controlling the Blank Exposure Lamp (LED)

a. Outline

The blank exposure lamp consists of an array of 124 LEDs.

All of the 124 LEDs are turned ON when the document is exposed with the drum rotating and the potential control not in effect.

While the document is exposed, the ON control is in keeping with the reproduction ratio, copy paper size, and copy mode. The two LEDs each at the rear and the front are kept turned ON as long as the drum rotates.

b. Control for REDUCTION

While the document is exposed in the REDUCTION mode, LEDs (rear) in numbers suited to the cassette size and reduction ratio are turned ON to expose the non-image areas.

c. Control for DIRECT

While the document is exposed in the DIRECT mode, LEDs (rear) in numbers suited to the cassette size are turned ON to expose the non-image areas.

For fixed reproduction ratios and when standard-size copy paper is used in the DIRECT mode, a non-image area about 2.5 mm in width is created at the rear and front of the image. This is called standard frame erasing.

The non-image area can be changed from about 2.5 mm to 0 mm in the service mode.

d. Control for Sheet/Document Frame Erasing Mode

In the sheet frame erasing mode, LEDs are turned ON so that strips of area about 7.5 mm in width corresponding to the three sides of the copy paper will be kept free of toner.

Note:
In the manual mode, frame erasing will be based on the maximum size (297 × 432 mm) regardless of the size of the copy paper selected.

Frame erasing for the universal cassette will be based on the maximum paper size that can be accommodated by the cassette. If the copy paper size used in the universal cassette has been registered, however, the registered size will be used for frame erasing.

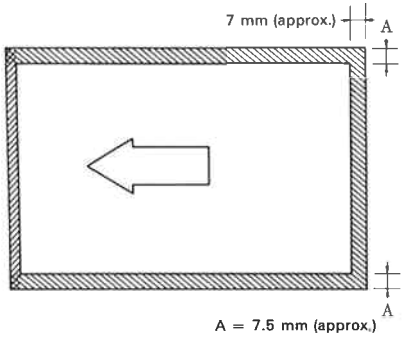

Figure 3-35

In the document frame erasing mode, LEDs are turned ON so that strips of area about 2.5 mm in width corresponding to the three sides of the document will be free of toner.

e. Control for Book Frame Erasing Mode

In the book frame erasing mode, frame erasing is based on the document size selected and performed as shown in Figure 3-36. This mode is identical to the document frame erasing mode with the addition of frame erasing across the center of the document.

Frame erasing across the center is such that a strip running 5 mm from the center on both sides (10 mm in width) is made free of images.

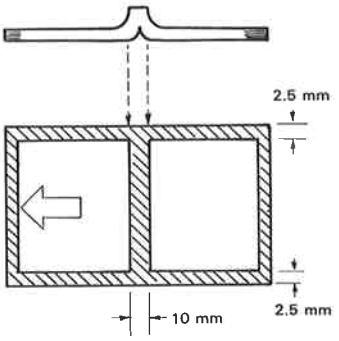

Figure 3-36

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f. Control for AE Mode

Since the surface potential of the drum is measured in the AE mode, the blank exposure lamp must be kept OFF.

On the other hand, as the points at which the potential is measured are limited, only those LEDs corresponding to the points of measurement are kept OFF and those outside are kept ON.

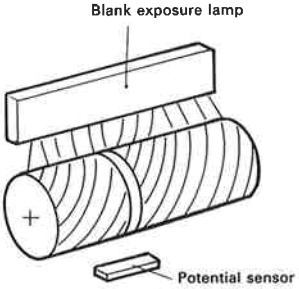

Figure 3-37

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6. Primary and Transfer Corona Current Control Circuits

a. Outline

Figure 3-37 shows the circuits which control the primary and transfer coronas. The functions of the circuits are as follows:
Turns primary corona current ON and OFF
1) Turns primary corona current ON and OFF
2) Changes primary corona current value
3) Turns transfer corona current ON and OFF
4) Changes transfer corona current value

b. Controlling the Primary Corona Current

The primary corona current is turned ON and OFF and its current value is changed by the primary corona level control command (HVTPC) from the DC controller PCB.

① High-Voltage Transformer for Primary Corona ON
If HVTPC output is 16 V or less,
└Differential amplifier circuit ON
└High-voltage transformer for primary corona ON
└LED3 ON.

In this condition, the high-voltage transformer sends high voltage suited to the primary corona level control command (HVTPC) to the primary corona.

If large corona current flows from the primary corona unit because of changes in the environment, the return signal to the differential amplifier circuit will be larger. As the output of the differential amplifier circuit will be smaller, the corona current from the primary corona unit will also be smaller. This way, the corona current value is controlled constant at all times.

② High-Voltage Transformer for Primary Corona OFF
If HVTPC output is 17 V or more,
└Differential amplifier circuit OFF
└High-voltage transformer for primary corona OFF
└LED3 OFF.

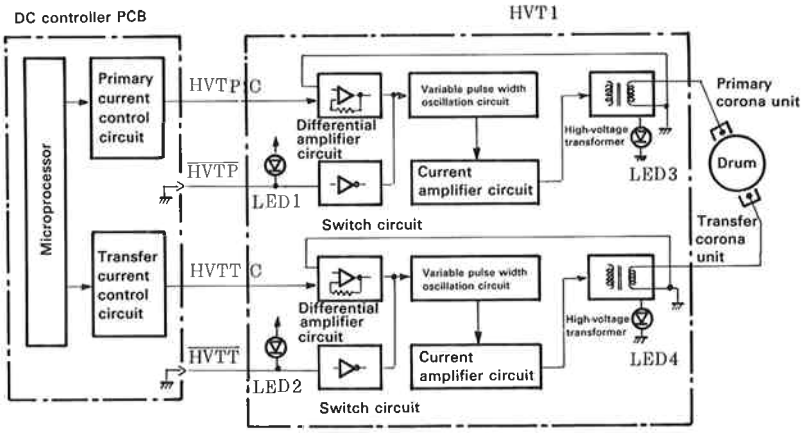

Figure 3-37

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c. Controlling the Transfer Corona Current

The primary corona current is controlled and its current value is changed by the transfer corona level control command (HVTTC) from the DC controller PCB.

① High-Voltage Transformer for Transfer Corona ON

If HVTTC output is 16 V or less,
└Differential amplifier circuit ON
└High-voltage transformer for transfer corona ON
└LED4 ON.

In this condition, the high-voltage transformer sends high voltage suited to the transfer corona level control command (HVTTC) to the transfer corona.

If large corona current flows from the transfer corona unit because of changes in the environment, the return signal to the differential amplifier circuit will be larger. As the output of the differential amplifier circuit will be smaller, the corona current from the transfer corona unit will also be smaller. This way, the corona current value is controlled constant at all times.

② High-Voltage Transformer for Transfer Corona OFF

If HVTTC output is 17 V or more,
└Differential amplifier circuit OFF
└High-voltage transformer for transfer corona OFF
└LED4 OFF.

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7. Separation and Pre-Transfer Corona Current Control

a. Outline

Figure 3-38 shows the circuits which control the separation corona current and pre-transfer corona current. The functions of the circuits are as follows:

① Turns AC component of separation and pre-transfer corona current ON and OFF
② Changes separation corona current value
③ Changes pre-transfer corona current value

b. Turning the AC Component of the Separation and Pre-Transfer Corona Current ON and OFF

The AC component of the separation and pre-transfer corona current is turned ON and OFF by the AC component ON signal ($\overline{\text{ACON}}$).

c. Controlling the Separation Corona Current

The separation corona current value is changed by the separation corona level control command (HVSCT) from the DC controller PCB.

① High-Voltage Transformer for Separation Corona ON
HVSCT output
└Variable pulse width oscillation circuit ON
└High-voltage transformer ON

In this condition, the high-voltage transformer sends high voltage suited to the separation corona level control command (HVSCT) to the separation corona unit.

If large corona current flows from the separation corona unit because of changes in the environment, the return signal to the variable pulse width oscillation circuit will be larger. At the time, the variable pulse width oscillation circuit controls the output signal to lower the corona current from the separation corona unit. This way, the corona current value is controlled constant at all times.

② High-Voltage Transformer for Separation Corona OFF
No HVSCT output (0 V)
└Variable pulse width oscillation circuit OFF
└High-voltage transformer OFF

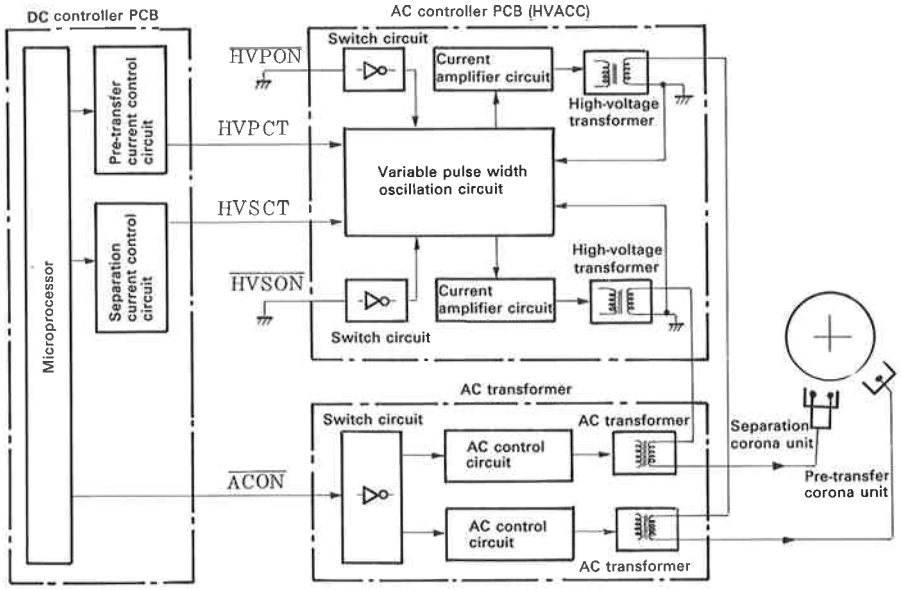

Figure 3-38

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d. Controlling the Pre-Transfer Corona Current

The pre-transfer corona current is changed by the pre-transfer corona level control command (HVPCT) from the DC controller PCB.

① High-Voltage Transformer for Pre-Transformer Corona ON

HVPCT output
└Pulse width variable oscillation circuit ON
└High-voltage transformer ON

In this condition, the high-voltage transformer sends high voltage suited to the pre-transfer corona level control command (HVPCT) to pre-transfer corona unit.

If large corona current flows from the pre-transfer corona unit because of changes in the environment, the return signal to the variable pulse width oscillation circuit will be larger. At the time, the variable pulse width oscillation circuit controls the output signal to lower the corona current from the pre-transfer corona unit. This way, the corona current value is controlled constant at all times.

② High-Voltage Transformer for Pre-Transformer Corona OFF

No HVPCT output
└Pulse width variable oscillation circuit OFF
└High-voltage transformer OFF

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B. Developing Assembly and Cleaning Unit

1. Outline

The black developing assembly is brought into contact with the drum when the black developing assembly release solenoid (SL4) is OFF; the drive from the main motor is transmitted to the cams.

The CD unit is brought into contact with the drum when the CD unit engage solenoid (SL3) is ON; the drive of the main motor is transmitted to the cams.

The rotation of the black developing assembly and CD unit is by transmission of drive from the main motor through the developing assembly clutch.

The amount of black toner inside the black developing assembly is monitored by the black toner level detection circuit and, when the amount falls below the specified value, toner is supplied from the hopper unit.

The amount of black toner inside the hopper is monitored by the toner sensor (Q10) and, when it falls short of the specified value, 'ADD TONER' is indicated on the control panel.

Toner is supplied from the black toner hopper unit to the black developing assembly by the hopper motor (M8)

The concentration of the color toner inside the CD unit is detected by the color toner concentration detection circuit and, when it falls short of the specified value, the color toner supply solenoid (SL2) goes ON.

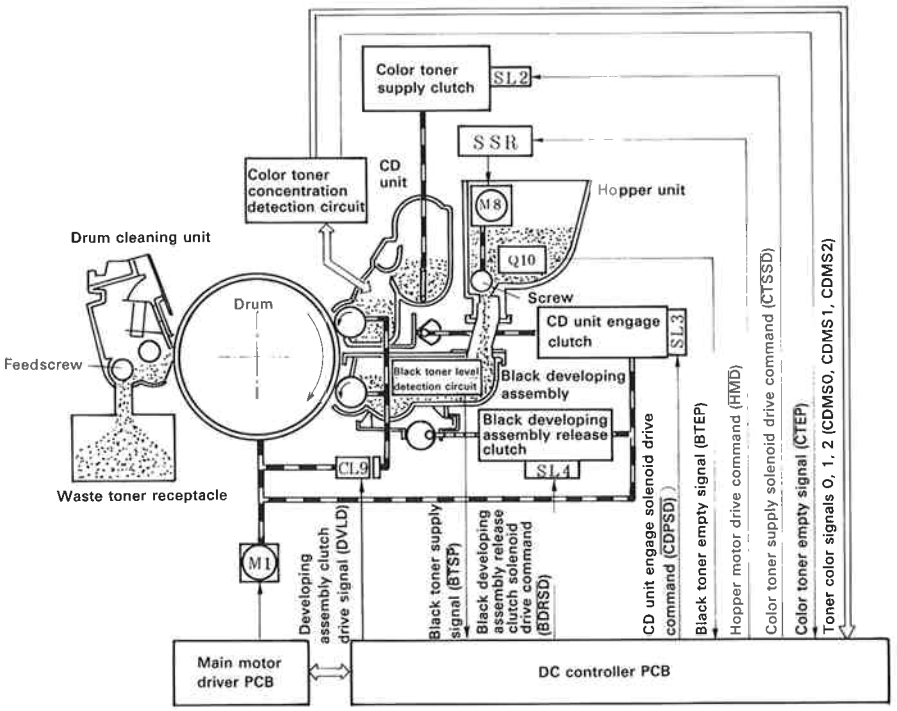

Figure 3-39

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When the CD unit is in contact with the drum and the drum is rotating, the stirring rod rotates by drive from the drum gear to supply toner to the developing cylinder.

When the color toner hopper unit runs out of toner and the color toner concentration detection circuit continues to detect the absence of color toner over the specified period of time, 'ADD TONER' is indicated on the control panel.

The waste toner scraped by the cleaning blade is collected in the waste toner receptacle. The copier is not equipped with a mechanism which detects the amount of waste toner.

2. Detecting and Controlling the Black Toner Amount

The amount of black toner inside the developing assembly is monitored by the black toner level detection circuit.

The developing assembly is equipped with two sensors; one of the sensors is for reference, and the other for detection of the amount of toner.

The developing cylinder and the blade mounting plate are given an AC bias, and a magnetic field is formed around them.

The sensor for reference is fixed opposite the blade mounting plate and used to generate constant voltage at all times. The output voltage from the sensor for detection, on the other hand, changes depending on whether toner (inducer) is present or absent around it. Detection is made by comparing the outputs of these two sensors.

① Large Amount of Toner
Toner is present around the sensor used for detection, and the output of the sensor is equal to the output voltage of the sensor used for reference.
This causes the output from the comparator to go '0', and the black toner supply signal ($\overline{BTSP}$) goes '1'.

② Small Amount of Toner
The toner around the sensor used for detection decreases in amount, and the output voltage from the sensor lowers. On the other hand, as the output of the sensor used for reference remains the same, the output remains high.
The difference in voltage causes the output from the comparator to go '1', and the black toner supply signal ($\overline{BTSP}$) goes '0'.
The microprocessor then turns the hopper motor ON to supply toner to the black developing assembly.

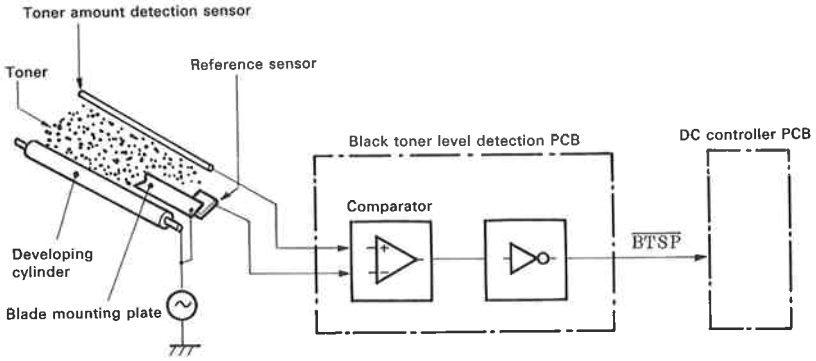

Figure 3-40

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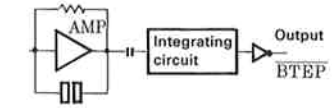
The toner sensor used inside the black toner hopper uses a piezoelectric vibrator, which oscillates at several kHz in the absence of toner, causing the output of the sensor to go '0'. In the presence of toner, the weight of the toner stops the oscillation of the piezoelectric vibrator, causing the output of the sensor to go '1'.

When the toner sensor inside the hopper detects the absence of toner, 'ADD TONER' is indicated on the control panel after completing the copy cycle.



Piezoelectric vibrator

Figure 3-41

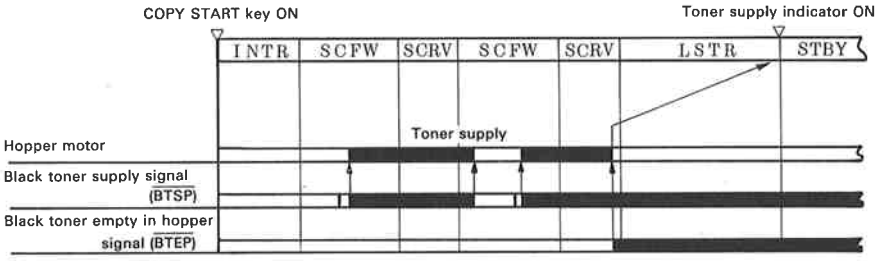


Figure 3-42

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3. CD Unit

a. Outline

The CD unit consists of the developing assembly and the hopper unit.

When the concentration of the developer grows lower than the specified value, the color toner supply solenoid (SL2) goes ON to supply toner from the hopper unit to the developing assembly. If the concentration of the developer fails to reach the value specified after the color supply solenoid has remained ON over the specified period of time, the copying operation is stopped immediately, and 'ADD TONER' is indicated on the control panel.

b. Color Toner Concentration Detection Circuit

The concentration of color toner is monitored through detection of the ratio of toner and carrier.

A lamp exposes the developer and the reflected light is detected by the photodiode (Q851) and communicated to the color toner concentration detection circuit as the concentration signal.

At the same time, the direct light from the lamp is detected by the photodiode (Q852) and sent to the color toner concentration detection circuit as the reference light signal.

The toner concentration detection circuit compares these two signals to check the concentration of the toner.

① Inadequate Amount of Toner

When the toner is inadequate in amount, the ratio of the carrier increases, and the light reflected by the developer in turn decreases. As a result, the voltage to the comparator lowers, causing its output to go '1'.

This causes the color toner empty signal (CTEP) to go '0' to turn the color toner supply solenoid ON. At the same time, LED801 on the color toner concentration detection circuit goes ON.

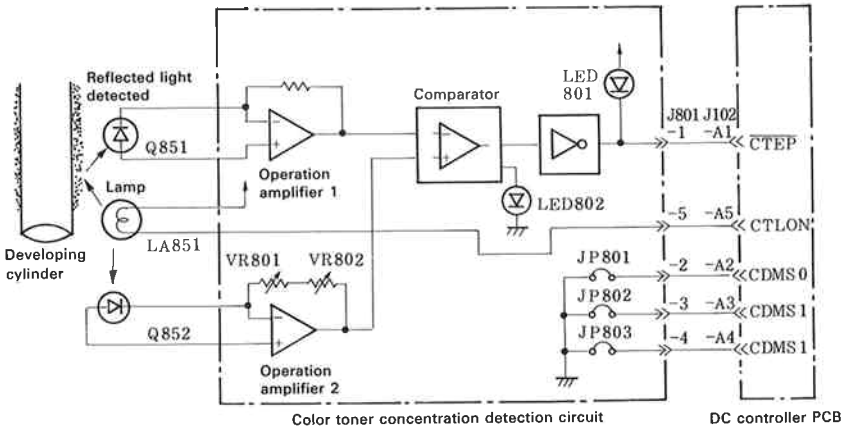

Figure 3-43

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② Suitable Amount of Toner
As long as the toner is suitable in amount, the ratio of the carrier is small, and much light is reflected by the developer. As a result, the voltage to the comparator increases, causing its output to go '0'.
This causes the color toner empty signal ($\overline{CTEP}$) to go '1', and the toner supply solenoid remains still.

Note:
The carrier in general is blackish in color and, as such, it reflects only a small amount of light. This is why the reflected light is limited when the ratio of the carrier is great.

The color in the CD unit is identified for its type by the toner color signals (CDMS 0, 1, and 2) from the color toner concentration circuit to the DC controller PCB.

Signal	Red	Blue	CD unit absent
Toner color signal 0 (CDMS0)	0	1	1
Toner color signal 1 (CDMS1)	0	0	1
Toner color signal 2 (CDMS2)	0	0	1

Table 3-12

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c. Sequence for Color Toner Supply Indication

The amount of color toner inside the CD unit is detected during copy operation by the color toner concentration detection circuit.

When the color toner concentration detection circuit detects the absence of toner, the DC controller PCB immediately stops the copy operation and performs toner supply rotation (CTSR).

The toner supply rotation lasts 50 seconds at most and, when the color toner concentration circuit detects the presence of toner, is stopped to return to copy operation.

If the color toner concentration detection circuit detects the absence of toner after completion of the toner supply rotation, the main motor will be stopped and 'ADD TONER' will be indicated on the control panel.

Even after the CD unit is supplied with toner and the COPY START key is pressed, the color toner concentration detection circuit still detects the absence of toner; for this reason, toner supply rotation is performed (50 sec max.).

When the color toner concentration detection circuit detects the presence of toner, the toner supply rotation is stopped, and copy operation is started.

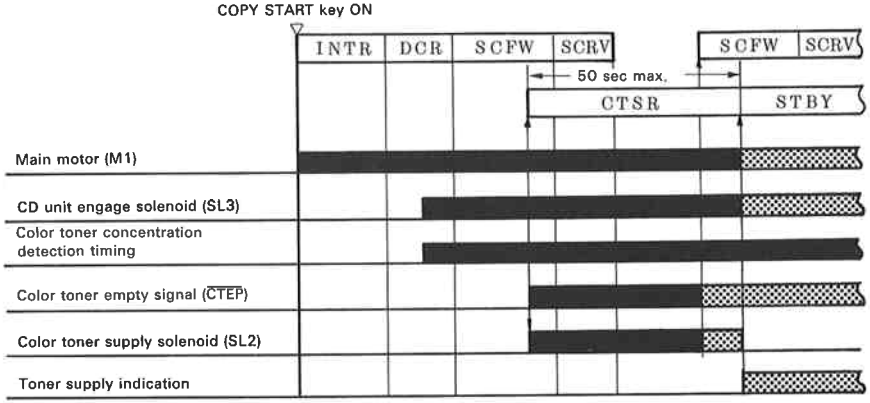

Figure 3-44 Sequence for Toner Supply During Copy Operation

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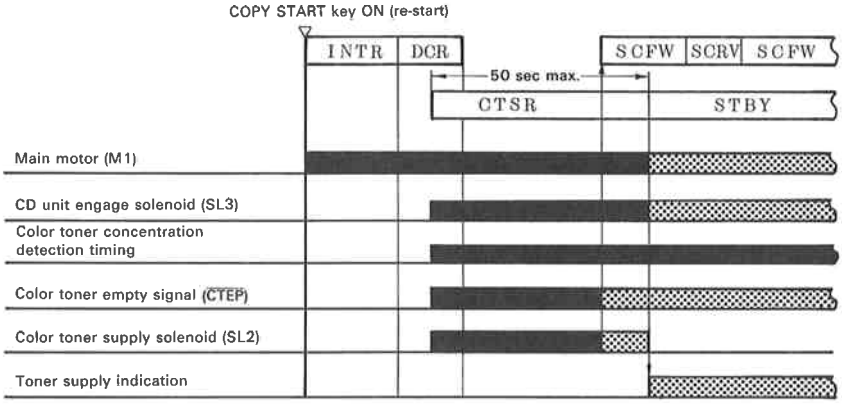

Figure 3-45 Sequence After Toner Supply

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4. Sequence for Engaging and Disengaging the Developing Assembly

a. Outline

The cam used to engage or disengage the black developing assembly and CD unit is controlled by the spring clutch, control ring, and solenoids (SL3 and SL4).

When the solenoids go ON or OFF to move the black developing assembly or CD unit, the drive from the main motor is transmitted as shown in Figure 3-46, thereby locating the developing assembly of the color selected opposite the drum.

When the power switch is turned OFF, the main motor and SL4 are turned ON and SL3 is turned OFF, thereby stopping the developing assembly as disengaged. Thereafter, the main motor and SL4 are turned OFF.

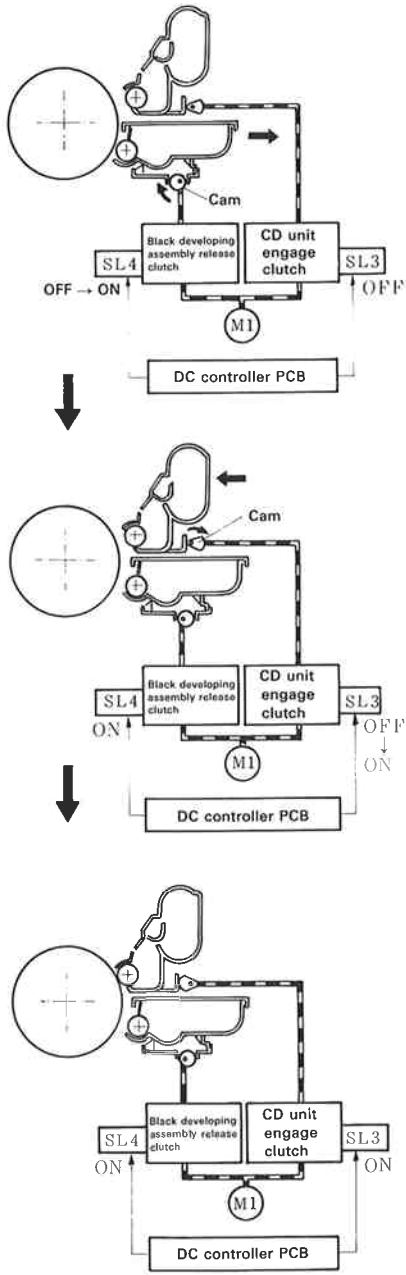

Figure 3-46

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b. Sequence for Color Copies

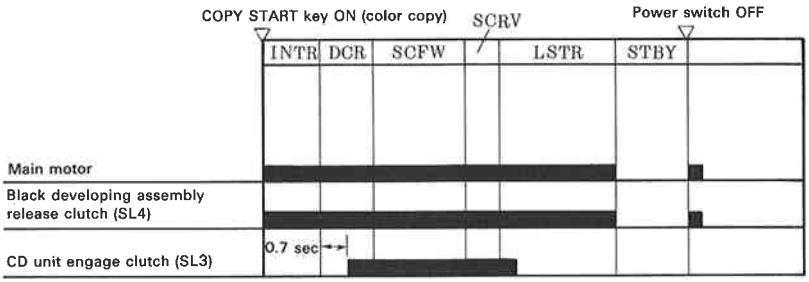

Figure 3-47

c. Sequence for Color Overlay Copies (page separation)

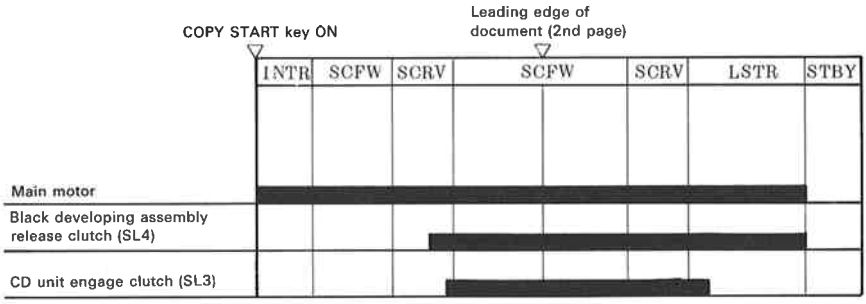

Figure 3-48

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5. Controlling the Developing Bias and Roller Electrode

a. Outline

The developing cylinder is given AC and DC biases (V_{DB}) during copy operation. For the DC bias, its application during copy operation is of a voltage made of V_{L2} measured by the potential sensor before copy operation with the addition of + 15V.

In the photo mode, application during copy operation is of a voltage made of V_{L2} with the addition of + 75V.

In the color copy mode, V_{DB} is fixed at + 120 V for all modes.

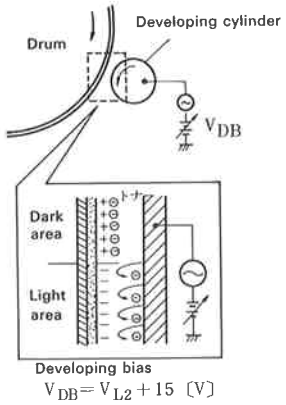

Figure 3-49

b. Control Timing

Bias	Voltage		Description
DC component	V_{L2} + 15V	SCFW,SCRV during copy operation	Prevents fogging on white background.
AC component	1400 Vp-p, 1800 Hz		Performs toner projection.

Table 3-13

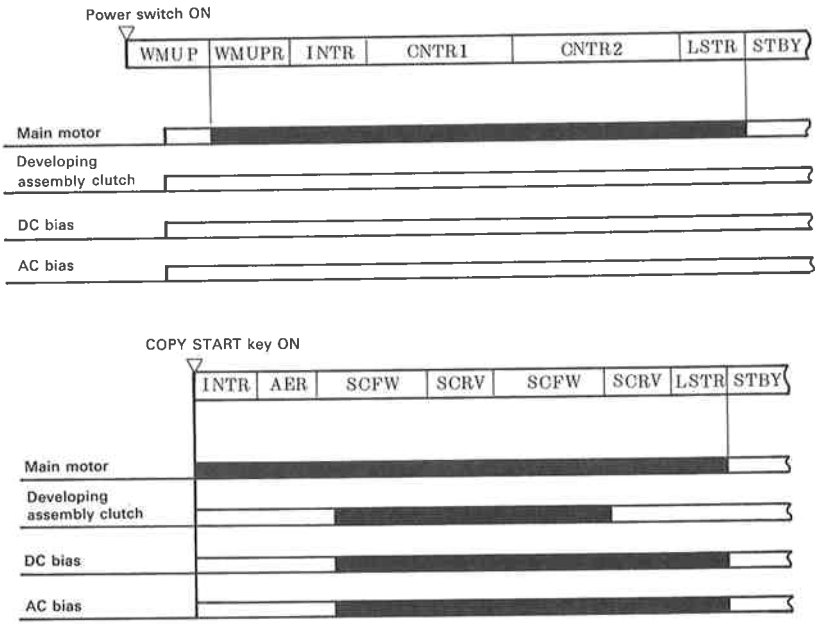

Figure 3-50

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c. Developing Bias Control Circuit

The circuit which controls the developing bias has the following functions:

(1) Turns AC bias ON and OFF
(2) Turns DC bias ON and OFF

① AC Bias OFF

When $\overline{ACBTP}$ = 1,
└AC bias switch circuit ON
└Square wave generation circuit output "SHUT."

This condition stops the AC bias supply to the developing cylinder.

② AC Bias ON

When $\overline{ACBTP}$ = 0,
└AC bias switch circuit OFF.

The output of the square wave generation circuit is amplified by the current amplifier circuit, increased to 1400 Vp-p by the AC transformer, and supplied to the developing cylinder.

③ Controlling the DC Bias Voltage Level

The voltage of the DC bias is determined by the signal (DCBC) from the DC controller PCB.

When the output from the DC controller PCB (DCBC) increases, the output of the differential amplifier circuit and inverter transformer also increases; this in turn increases the voltage of the DC bias.

d. Roller Electrode Bias Control Circuit

The circuit which controls the roller electrode has the following functions:

(1) Turns roller electrode ON and OFF
(2) Supplies power to surface potential measuring circuit

① Roller Electrode Bias OFF

When $\overline{ROED}$ (roller electrode drive signal) is '1',
└Switch circuit ON
└Pulse generation circuit OFF
└Inverter transformer OFF.

This condition stops bias supply to the roller electrode. Further, the potential measuring circuit is deprived of power.

② Roller Electrode Bias ON

When $\overline{ROED}$ is 0,
└Switch circuit OFF
└Pulse generation circuit ON
└Inverter transformer ON.

This condition supplies a bias of about -1000 V to the roller electrode. Further, the potential measuring circuit is supplied with power and goes ON.

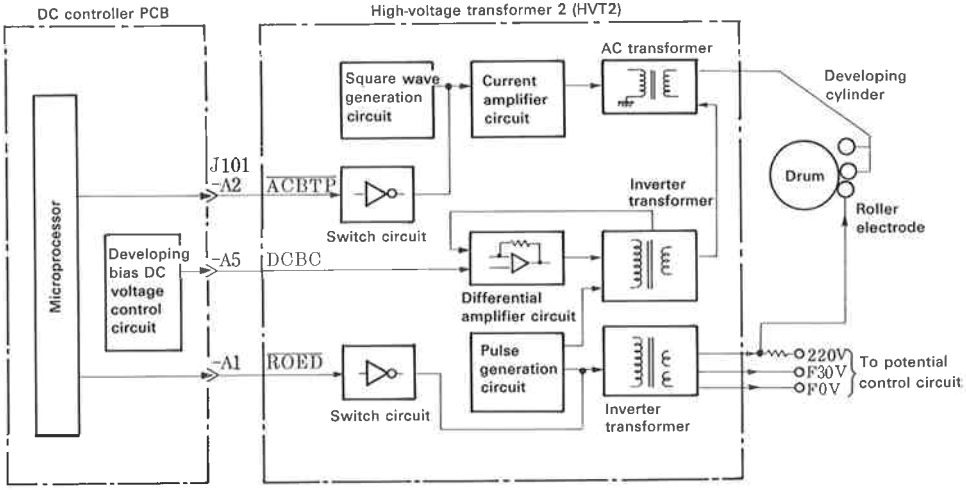

Figure 3-51

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C. Drum Heater Control Circuit

The inside of the drum is equipped with a drum heater (80 W), and the heater is controlled to keep the surface temperature of the drum constant at all times.

When the power plug is connected to an outlet, AC power is supplied to the drum heater control PCB regardless of the position of the power switch. As such, the drum heater is turned ON and OFF as long as the power plug is connected.

The temperature of the drum is measured by the thermistor built into the drum heater. When the temperature of the drum lowers from the specified value, the output from the comparator goes '1', causing the trigger circuit to go ON. This in turn causes the triac to go ON, thereby turning the drum heater ON.

When the temperature of the drum rises higher than the specified value, the output from the comparator goes '0', turning the drum heater OFF.

Drum surface temperature control value ..... 42°C
Thermal fuse rated temperature ..... 76°C

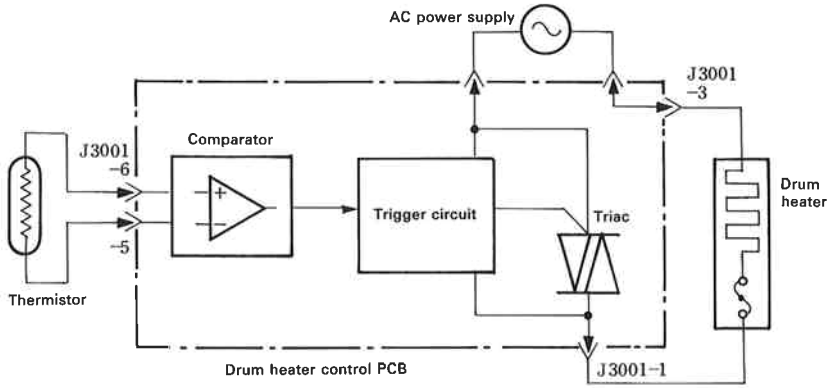

Figure 3-52

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D. Cleaning of Primary, Transfer, and Separation Corona Wires

1. Outline

The copier is equipped with an automatic cleaning mechanism to clean the primary, transfer, and separation corona wires. Cleaning is performed under the following conditions:

① If the temperature of the fixing assembly is 160°C or less when the power switch is turned ON.
② When the corona wires are cleaned in the service mode.
③ Upon completion of last rotation for every 2,000 copies.

If cleaning has been performed under conditions ① and ② above, cleaning will be every 2,000 copies thereafter.

2. Cleaning of Corona Wires

Cleaning of the corona wires is performed by moving the cleaning unit forward and in reverse along the corona wires by the cleaning motors (M6 and M7).

The cleaning motors are controlled for normal and reverse rotation by combinations of two signals.

Motor rotation \ Signal	PCC 1 / TCC 1	PCC 2 / TCC 2
Normal (forward)	0	1
Reverse (reverse)	1	0
Still	1	1

Table 3-14

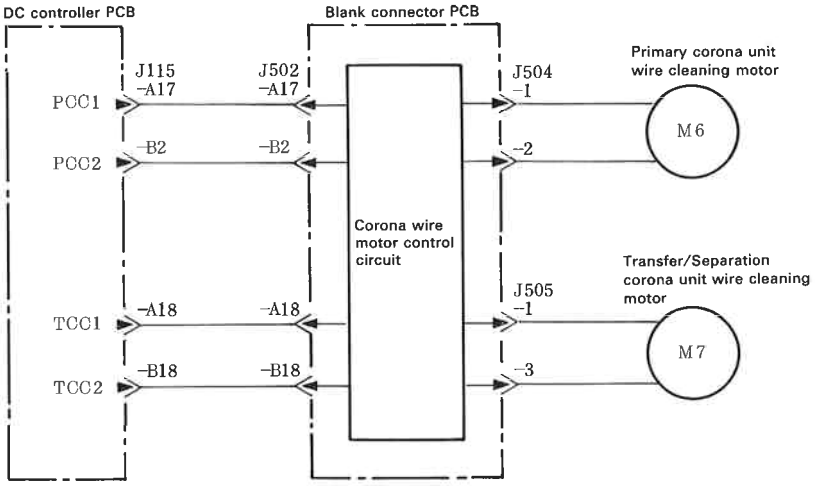

Figure 3-53

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IV. PAPER PICK-UP AND FEED SYSTEM

A. Outline

The size and presence/absence of the cassette set in the cassette holder is detected by the four switches (SW701 through SW704) located each for the upper and lower cassette holders.

The lifter raises the copy paper set in the cassette and stops when detected by the photointerrupter (Q23 or Q25). At the time, the photointerrupter (Q24 or Q26) detects the presence/absence of paper inside the cassette.

When the paper pick-up roller clutch (CL5 or CL7) goes ON, the pick-up roller rotates to feed a single sheet of copy paper from the cassette into the copier.

The copy paper is controlled by the No. 1 registration roller so that the leading edge of the image on the drum and that of the copy paper match and moved on to the copy tray through the transfer, separation, feeder, fixing, and delivery sections.

In the case of two-sided/overlay copies, the No. 1 deflector solenoid goes ON to send the copy paper to the No. 2 feeder unit as soon as the copy paper comes out of the fixing assembly with its first side processed.

In the case of overlay copies, the No. 2 deflector sends the copy paper to the No. 2 feeder unit.

In the case of two-sided copies, the No. 2 deflector solenoid (SL12) goes ON to send the copy paper to the copy paper inverter unit. Thereafter, the No. 2 defelctor solenoid goes OFF.

When the copy paper has passed the photointerrupter (Q21), the copy inverter solenoid (SL5) goes ON, and the normal/reverse roller rotates in reverse to send the copy paper to the No. 2 feeder unit.

The second side is controlled by the No. 2 registration roller and the No. 1 registration roller so that the leading edge of the image on the drum and that of the copy paper match and moved on to the copy tray through the transfer, separation, feeder, fixing, and delivery sections.

A paper alignment mechanism is provided so as to match the cross-feed edge of the copy paper for its first and second sides.

The photointerrupter (Q16) is located in the delivery unit and detects whether the copy paper has reached or has moved past.

If the copy paper fails to reach or pass the point within the specified period of time, the microprocessor judges the condition to be a jam and indicates 'CHECK PAPER' on the control panel.

The copier can make use of a multi-feeder and paper deck in addition to its upper and lower cassettes.

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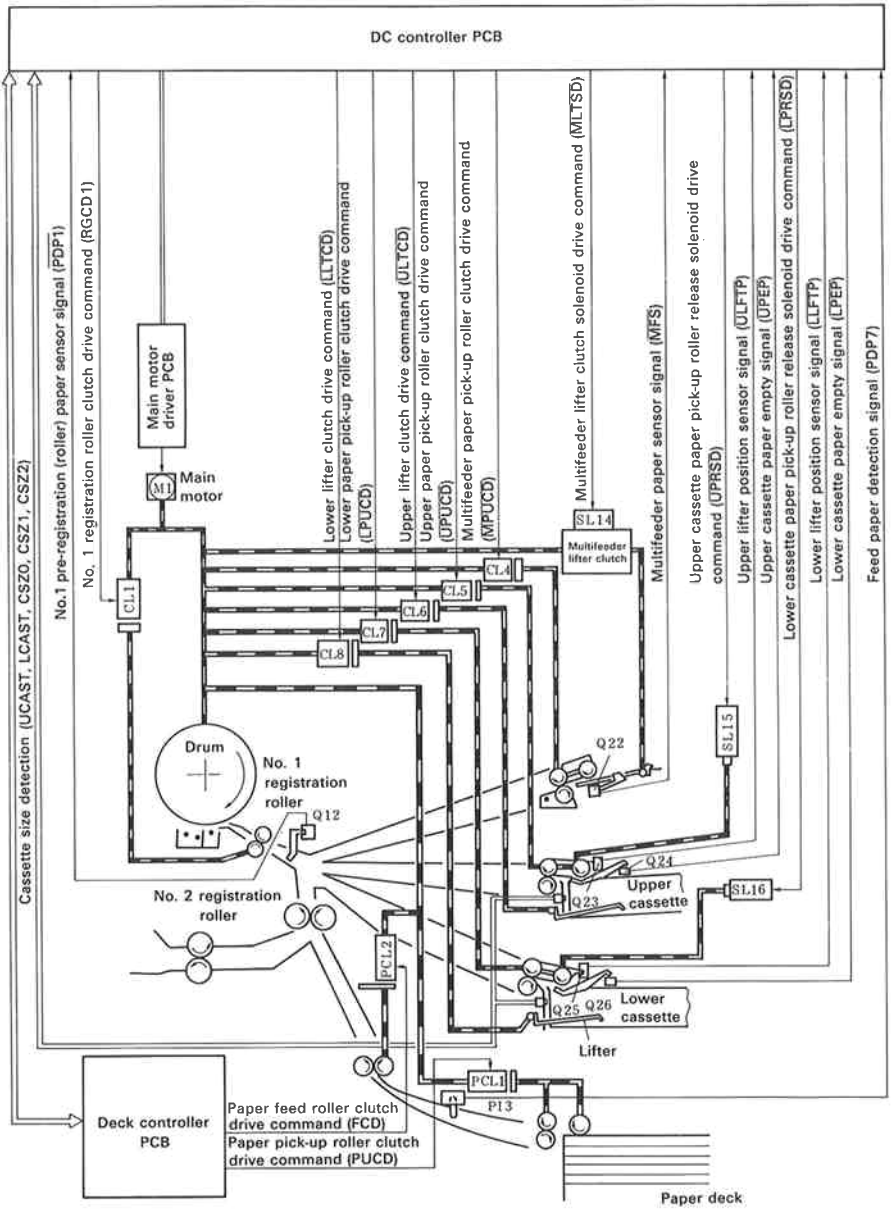
DC controller PCB
Cassette size detection (UCAST, LCAST, CSZ0, CSZ1, CSZ2)
No.1 pre-registration (roller) paper sensor signal (PDP1)
No. 1 registration roller clutch drive command (RGCD1)
Main motor driver PCB
Main motor
M1
CL1
Lower lifter clutch drive command (LLTCD)
Lower paper pick-up roller clutch drive command (LPUCD)
Upper lifter clutch drive command (ULTCD)
Upper paper pick-up roller clutch drive command (UPUCD)
Multifeeder paper pick-up roller clutch drive command (MPUCD)
Multifeeder lifter clutch solenoid drive command (MLTSD)
SL14
Multifeeder lifter clutch
CL4
CL5
CL6
CL7
CL8
Multifeeder paper sensor signal (MFS)
Upper cassette paper pick-up roller release solenoid drive command (UPRSD)
Upper lifter position sensor signal (ULFTP)
Upper cassette paper empty signal (UPEP)
Lower cassette paper pick-up roller release solenoid drive command (LPRSD)
Lower lifter position sensor signal (LLFTP)
Lower cassette paper empty signal (LPEP)
Feed paper detection signal (PDP7)
Drum
No. 1 registration roller
Q12
Q22
SL15
Q24
Upper cassette
Q23
SL16
No. 2 registration roller
PCL2
Q25
Q26
Lower cassette
Lifter
PCL1
P13
Deck controller PCB
Paper feed roller clutch drive command (FCD)
Paper pick-up roller clutch drive command (PUCD)
Paper deck

Figure 3-54

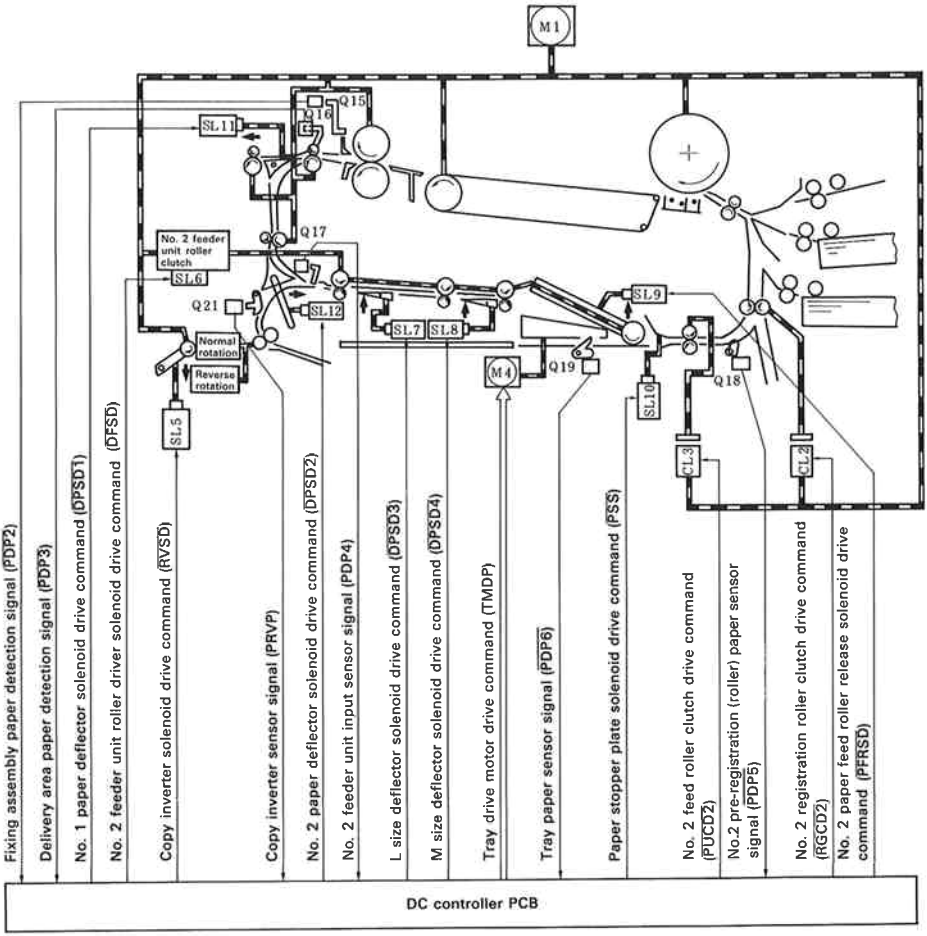

Figure 3-55

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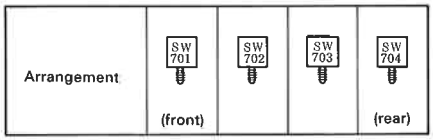
B. Detection of Cassette Size

Setting a cassette in the cassette holder actuates the respective switches.

The microprocessor detects the size and presence/absence of a cassette based on the combination of switches so actuated as shown in Table 3-15 and determines parameters for the counter, scanner reversal, and blank exposure lamp.



No.	Cassette	Cassette holder switch			
		SW701	SW702	SW703	SW704
1	B5	OFF	OFF	OFF	ON
2	A4	OFF	OFF	ON	ON
3	B5R	OFF	ON	OFF	OFF
4	B4	OFF	ON	OFF	ON
5	A4R	OFF	ON	ON	OFF
6	A3	OFF	ON	ON	ON
7	U-S	ON	OFF	OFF	OFF
8	U-L	ON	OFF	ON	OFF
9	Letter	ON	OFF	ON	ON
10	Mini	ON	ON	OFF	OFF
11	Legal	ON	ON	OFF	ON
12	Letter R	ON	ON	ON	OFF
13	11" × 17" (Ledger)	ON	ON	ON	ON
14	No cassette	OFF	OFF	OFF	OFF

Table 3-15

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C. Paper Pick-Up from Cassette and Paper Deck

1. Outline

If the paper inside the cassette is not at the pick-up position when the COPY START key is pressed, the lifter clutches (SL6 and CL8) go ON, and the lifter rises.

The position of the lifter is detected by the photointerrupters (Q23 and Q25).

At the time, the photointerrupters (Q24 and Q26) detect the presence/absence of copy paper inside the cassette.

If the photointerrupters (Q24 and Q26) do not detect the presence of paper after the lifter has risen, the DC controller PCB judges the condition to be the absence of copy paper and indicates 'ADD PAPER' on the control panel.

The paper pick-up roller release solenoids (SL15 and SL16) go ON after the paper pick-up clutch goes ON, causing the paper-pick up roller unit to move up from the copy paper. The copy paper then is fed to the copier.

The registration roller is stationary at this time so that the copy paper forms an arch of about 6 mm at the registration roller unit.

After several seconds from the rising edge of the scanner at document edge signal, the paper pick-up clutch goes ON, and the No. 1 registration roller starts to rotate.

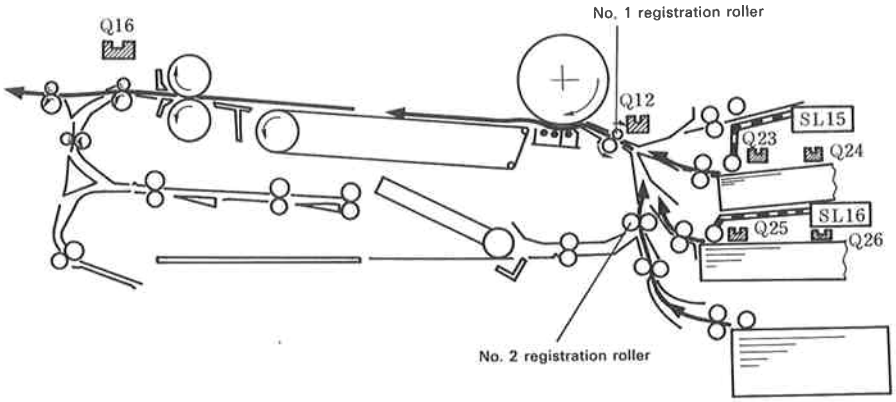

Figure 3-56

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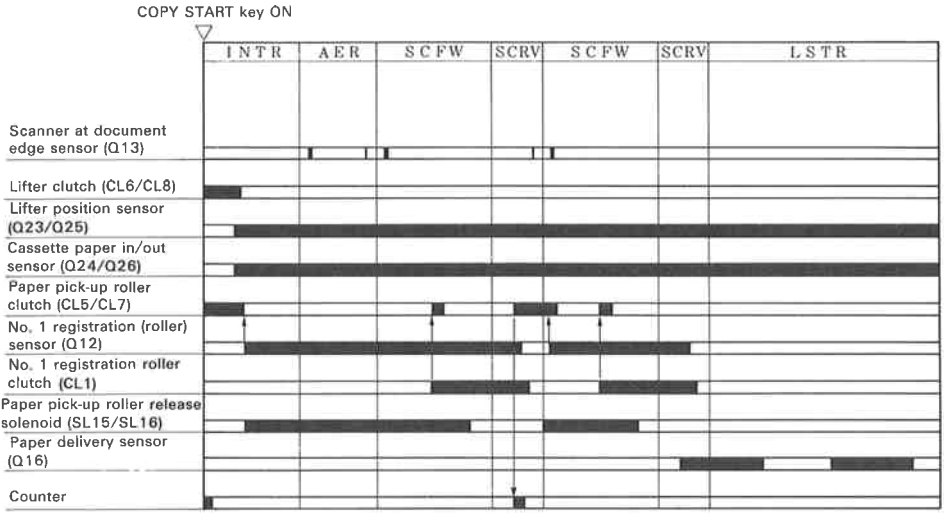

Figure 3-57 (pick-up from cassette)

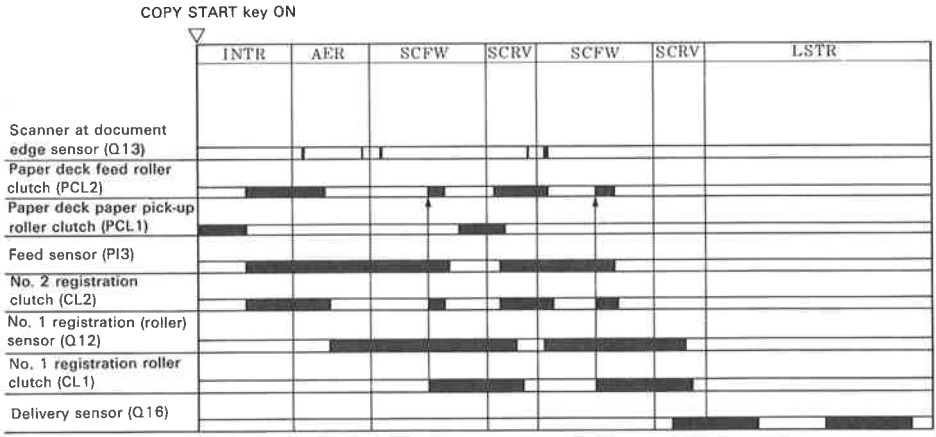

Figure 3-58 (pick-up from paper deck)

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2. Movement of Lifter in Paper Deck

a. Ascent

When the paper door is colsed, the lifter motor goes ON to raise the lifter.

When the lifter has moved up and, as a result, the sensor arm is pushed up, the lifter position sensor (PI2) sends signals to stop the lifter motor.

Copy paper is then picked up from the paper deck and, when the sensor arm moves away from the lifter position sensor, the lifter motor goes ON to move the lifter up about 2 mm.

Note:
For the lifter to move up, it is necessary that the lifter drive enable command (LIDE) be '0'.

b. Descent

When the paper door is opened, the lifter starts to lower.

Further, the lifter drive enable command (LIDE) goes '1' and lower the lifter if a jam occurs in the copier. The lifter stops when it has lowered to push against the lower limiter switch (MS3).

c. Forced Suspension

If the lifter continues to move up after the sensor arm blocks the lifter position sensor, the lifter is stopped as soon as the sensor arm pushes against the microswitch (MS3).

Further, if the lifter moves up in the absence of paper, the cam on the lifter pushes the microswitch (MS1) to stop the lifter.

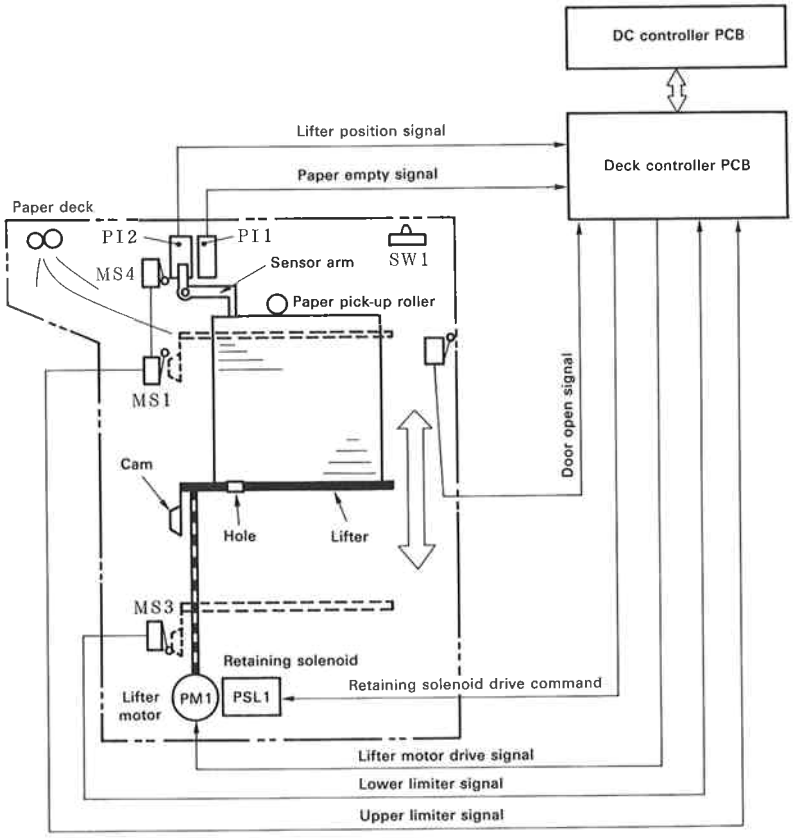

Figure 3-59

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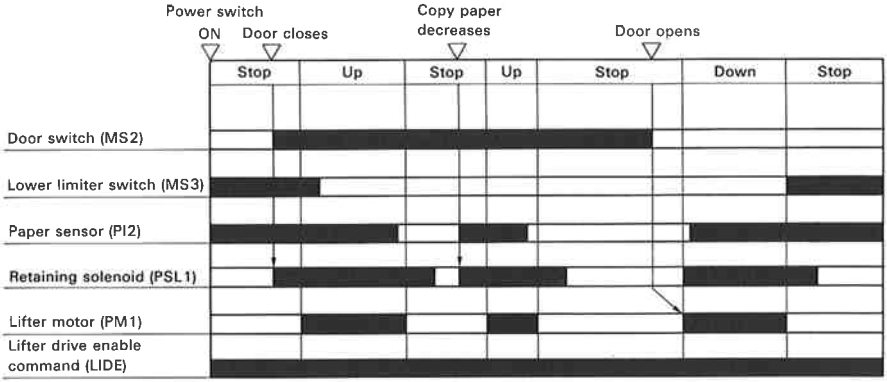

Figure 3-60

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D. Multifeed Pick-Up

1. Outline

When the COPY START key is pressed with copy paper stacked on the tray, the multifeeder lifter solenoid (SL14) goes ON to raise the multifeeder lifter and move the copy paper into contact with the paper pick-up roller. The copy paper is then fed into the copier by the rotation of the paper pick-up roller.

The copy sequence in the multifeeder mode is controlled the same way as when 432mm-long copy paper is fed.

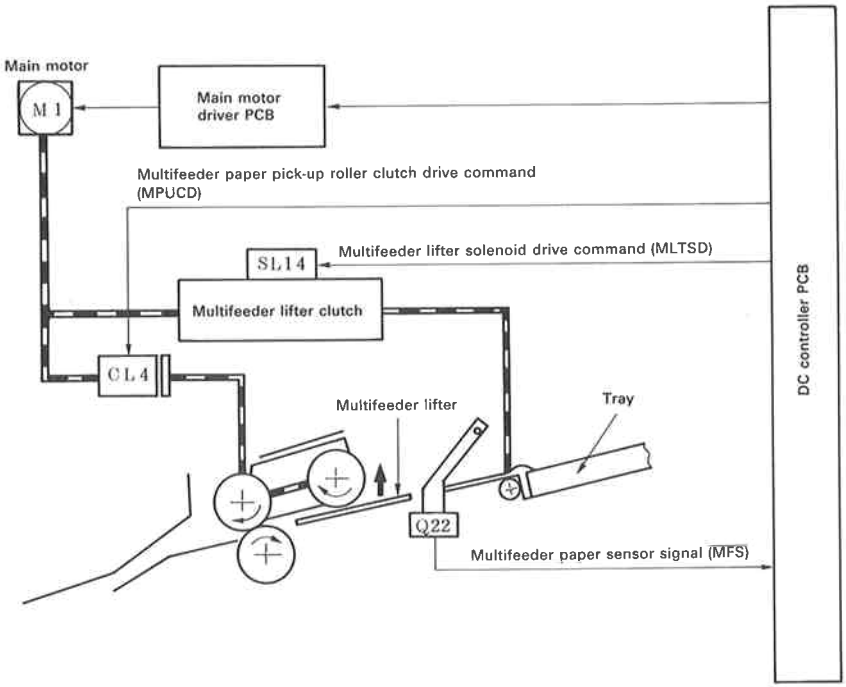

Figure 3-61

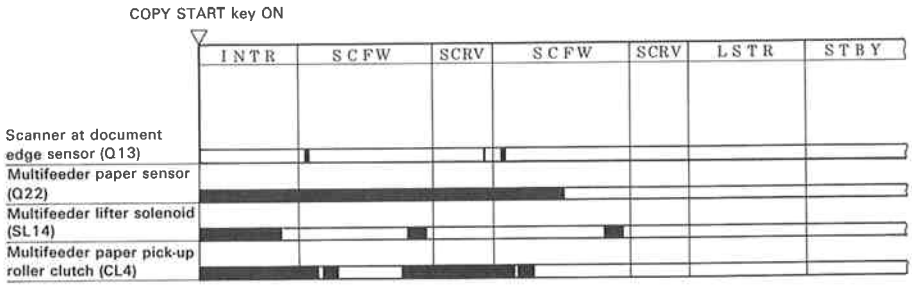

Figure 3-62

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E. Controlling the Registration Clutch

The registration clutch controls the copy paper so that the copy paper and the image on the drum match at a specified point.

Except in the binding mode, the registration roller clutch is controlled so that the leading edge of the copy paper and that of the image on the drum match.

In the binding mode, the registration roller clutch is controlled as shown in Figure 3-63 to allow for a binding margin.

Mode		Timing for copy paper	Shift (mm)	Copy paper on delivery tray
One-sided document → One-sided copy		B	Setting between 0 mm to 20 mm. Shift set at 5 mm supposed.	D, 5
One-sided document → Two-sided copy	1st side copy	A		D, 5
	2nd side copy	B		5 or 0
Two-sided document → Two-sided copy	1st side copy	A		D, 5
	2nd side copy	B		5
Two-sided document → One-sided copy	1st side copy	B		D, 5
	2nd side copy	B		D, 5 or 0
Page separation (one-sided copy)	1st side copy (left side)	B		D, 5
	2nd side copy (right side)	B		D, 5
Page separation → Two-sided copy	1st side copy (left side)	A		D, 5
	2nd side copy (right side)	B		5
One-sided document → Overlay copy	1st side copy	B		D, 5
	2nd side copy	B		
Two-sided document → Overlay copy	1st side copy	B		D, 5
	2nd side copy	B		
Page separation → Overlay copy	1st side copy (left side)	B		D, 5
	2nd side copy (right side)	B		

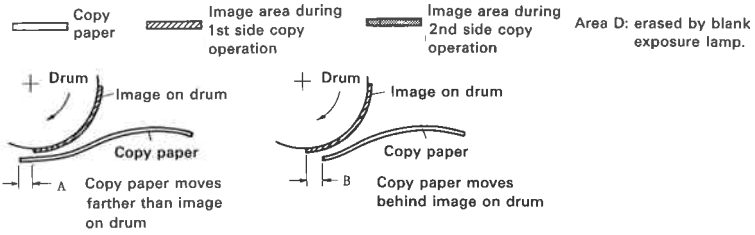

Figure 3-63

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F. Overlay Copy Operation (1st side)

As soon as the COPY START key is pressed, the No. 2 paper pick-up roller release solenoid (SL9) goes ON to raise the No. 2 paper pick-up roller.

The scanner at document edge signal (SCDP) is generated and, after about 285 clock signals, the No. 1 deflector solenoid (SL11) and paper stopper solenoid (SL10) go ON to activate the No. 1 deflector and paper stopper plate to form a path for overlay copy operation.

At the same time, the No. 2 feeder unit roller clutch solenoid (SL6) goes ON to activate the No. 2 feeder unit. (See Figure 3-55.)

The copy paper is fed to the No. 2 feeder unit.

When the first copy paper is fed to the tray, SL9 is turned OFF once, and the No. 2 pick-up roller is lowered to the copy paper.

This pushes the copy paper against the paper stopper plate so that the tray paper sensor (Q19) detects the copy paper.

The No. 2 pick-up roller is not lowered for the second copy paper or paper coming thereafter.

When the last copy paper has been fed to the tray, SL6, SL9, SL10, and SL11 are turned OFF.

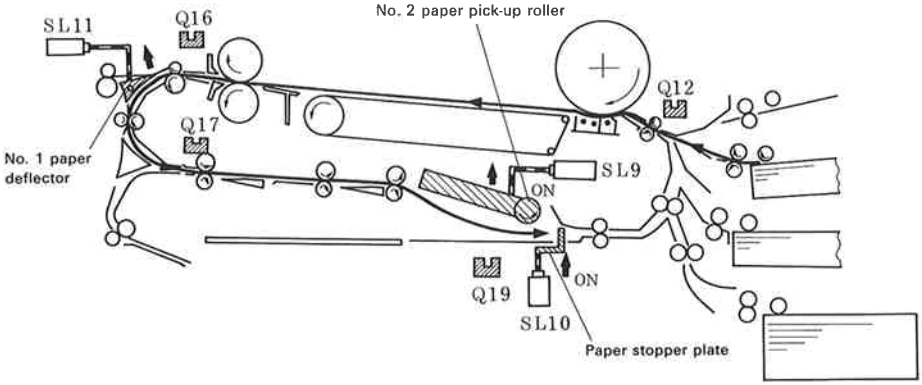

Figure 3-64

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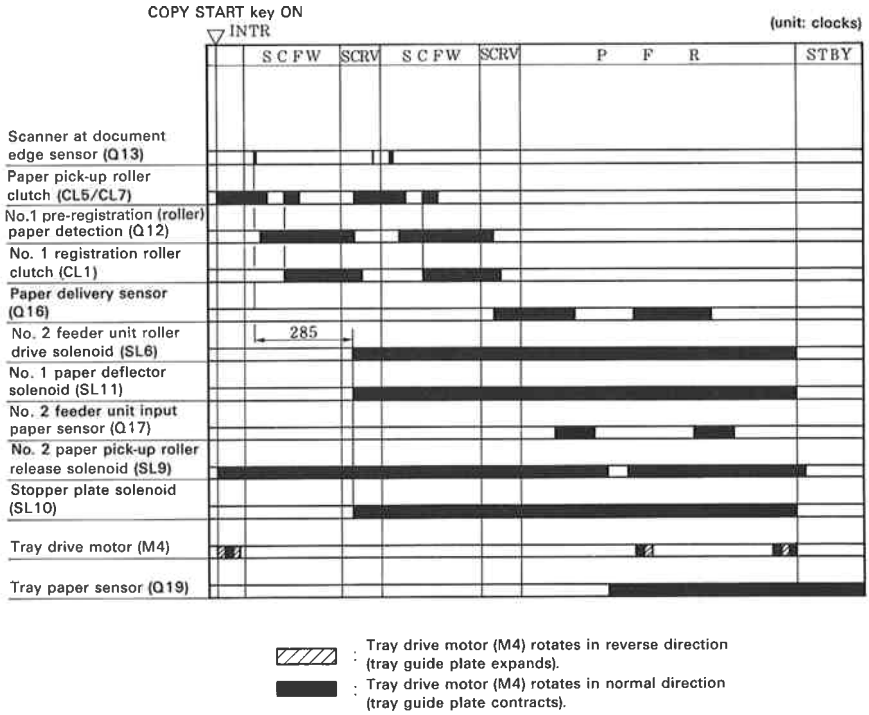
COPY START key ON
INTR
(unit: clocks)
S C F W
SCRV
S C F W
SCRV
P
F
R
STBY
Scanner at document edge sensor (Q13)
Paper pick-up roller clutch (CL5/CL7)
No.1 pre-registration (roller) paper detection (Q12)
No. 1 registration roller clutch (CL1)
Paper delivery sensor (Q16)
No. 2 feeder unit roller drive solenoid (SL6)
285
No. 1 paper deflector solenoid (SL11)
No. 2 feeder unit input paper sensor (Q17)
No. 2 paper pick-up roller release solenoid (SL9)
Stopper plate solenoid (SL10)
Tray drive motor (M4)
Tray paper sensor (Q19)
: Tray drive motor (M4) rotates in reverse direction (tray guide plate expands).
: Tray drive motor (M4) rotates in normal direction (tray guide plate contracts).

Figure 3-65 Sequence for Overlay Copies (1st side)

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G. Two-Sided Copy Operation (1st side)

As soon as the COPY START key is pressed, the No. 2 paper pick-up roller release solenoid (SL9) goes ON to raise the No. 2 paper pick-up roller.

The scanner at document edge signal (SCDP) is generated and, after about 285 clock pulses, the paper deflector solenoids (SL11 and SL12) and paper stopper plate solenoid (SL10) go ON to form a paper path for two-sided copy operation.

At the same time, the No. 2 feeder unit roller cluch solenoid (SL6) goes ON to activate the No. 2 feeder unit.

After the copy paper has passed the copy inverter sensor (Q21), the reversing solenoid (SL5) goes ON, and the normal/reverse roller rotates in reverse. This way, the copy paper is inverted and sent to the No. 2 feeder unit.

When the first copy paper has been fed to the tray, SL9 is turned OFF once, and the No. 2 pick-up roller is lowered to the copy paper.

This pushes the copy paper against the paper stopper plate so that the tray paper sensor (Q19) can detect the copy paper.

The No. 2 pick-up roller is not lowered for the second copy paper or paper coming thereafter.

When the last copy paper has been fed to the tray, SL6, SL9, SL10, SL11, and SL12 are turned OFF.

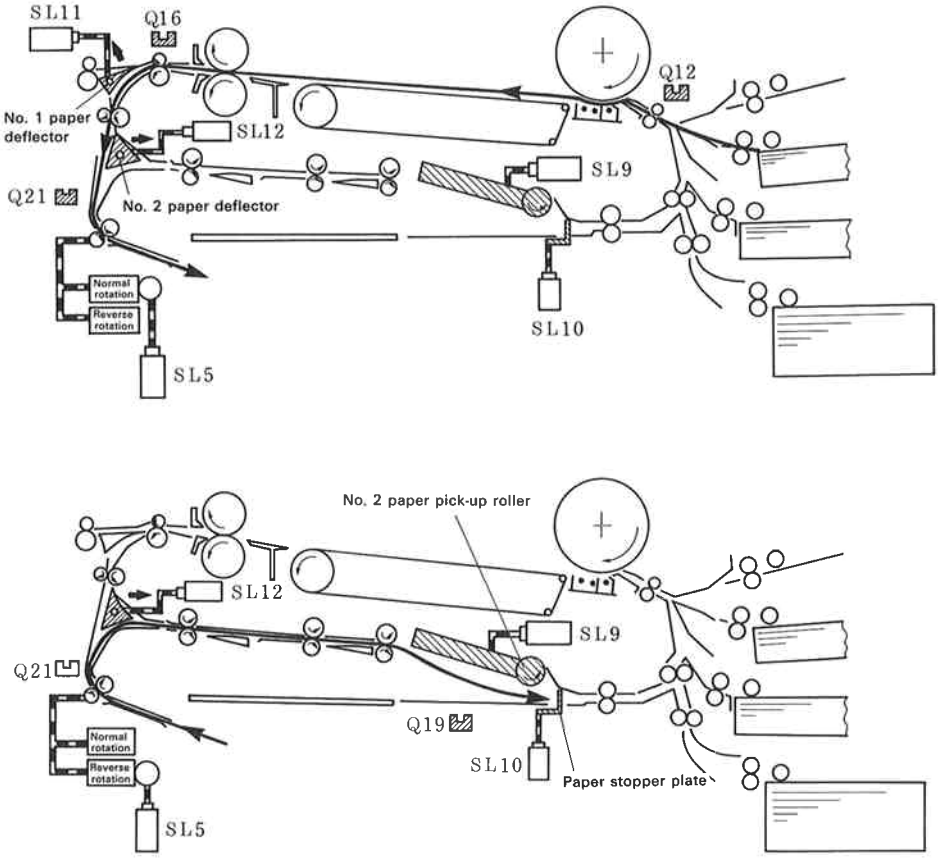

Figure 3-66

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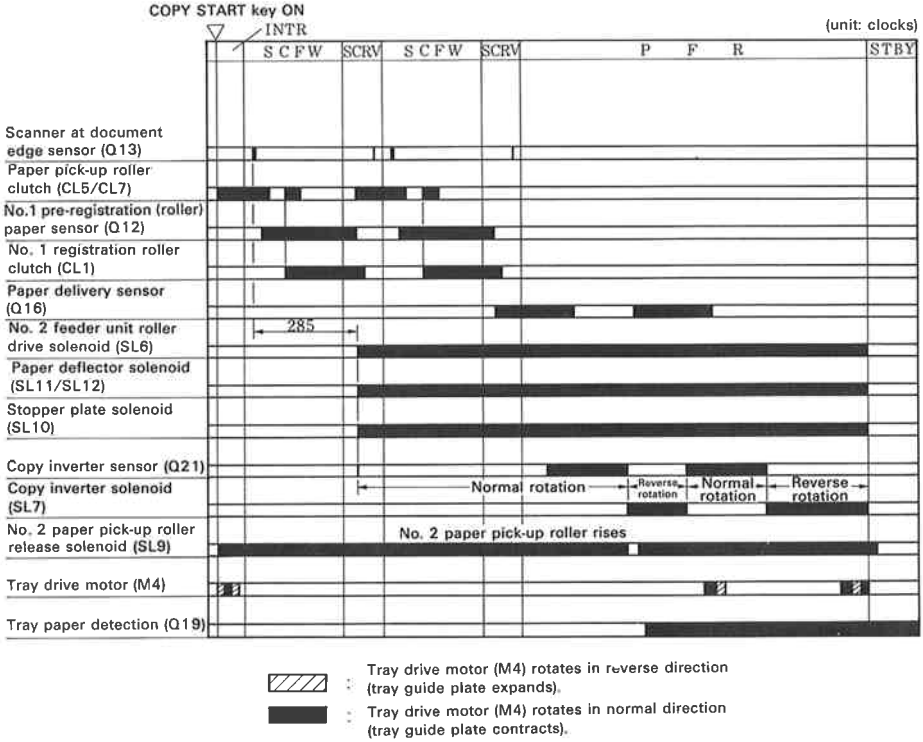
COPY START key ON
INTR
(unit: clocks)
S C F W
SCRV
S C F W
SCRV
P
F
R
STBY
Scanner at document edge sensor (Q13)
Paper pick-up roller clutch (CL5/CL7)
No.1 pre-registration (roller) paper sensor (Q12)
No. 1 registration roller clutch (CL1)
Paper delivery sensor (Q16)
No. 2 feeder unit roller drive solenoid (SL6)
285
Paper deflector solenoid (SL11/SL12)
Stopper plate solenoid (SL10)
Copy inverter sensor (Q21)
Copy inverter solenoid (SL7)
Normal rotation
Reverse rotation
Normal rotation
Reverse rotation
No. 2 paper pick-up roller release solenoid (SL9)
No. 2 paper pick-up roller rises
Tray drive motor (M4)
Tray paper detection (Q19)
: Tray drive motor (M4) rotates in reverse direction (tray guide plate expands).
: Tray drive motor (M4) rotates in normal direction (tray guide plate contracts).

Figure 3-67 Sequence for Two-Sided Copies (1st side)

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H. Overlay/Two-Sided Copy Operation (2nd side)

When overlay or two-sided copy operation for the first side of the copy is complete, No. 2 paper pick-up roller has lowered to the copy paper stacked inside the tray.

Overlay or two-sided copy operation for the second side is started in this condition.

COPY START key ON
- └→No. 2 feeder unit roller clutch solenoid (SL6) ON
  - └→No. 2 paper pick-up roller rotates to pick topmost sheet inside tray
    - └→ⓐ

ⓐ →No. 2 pick-up roller rises when copy paper is picked up
- └→No. 2 paper pick-up roller in rotation is lowered after 1st copy is picked up, and next copy paper is picked up

The No. 2 paper pick up roller repeats this sequence to pick each single sheet of copy paper.

When the last copy paper is picked up, the No. 2 paper pick-up roller is held up until the last copy paper is delivered and is lowered when the roller stops rotating.

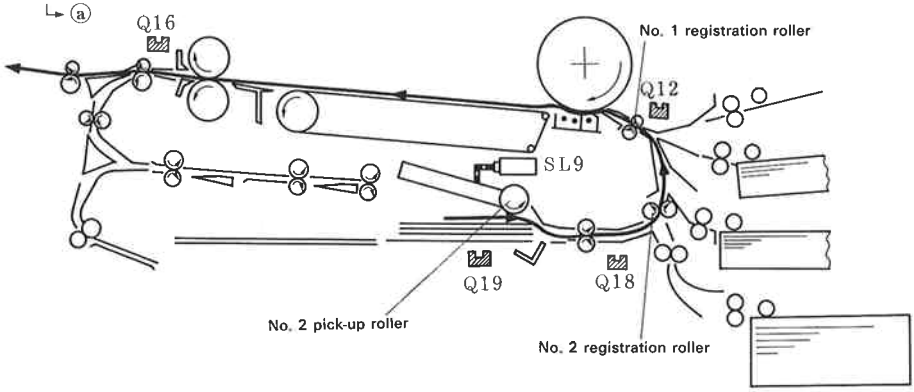
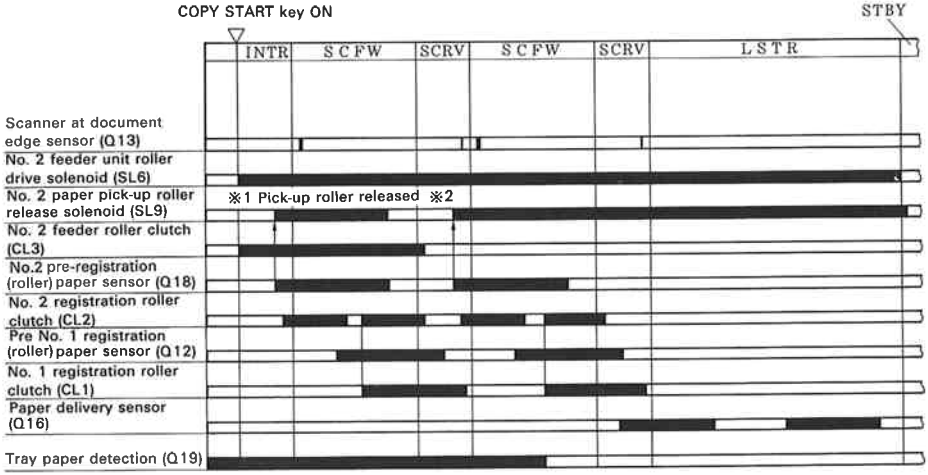


Figure 3-68

1. Overlay/Two-Sided Copy Sequence (2nd side)


COPY START key ON
STBY
INTR
S C FW
SCRV
S C FW
SCRV
L S T R
Scanner at document edge sensor (Q13)
No. 2 feeder unit roller drive solenoid (SL6)
No. 2 paper pick-up roller release solenoid (SL9)
※1 Pick-up roller released ※2
No. 2 feeder roller clutch (CL3)
No.2 pre-registration (roller) paper sensor (Q18)
No. 2 registration roller clutch (CL2)
Pre No. 1 registration (roller) paper sensor (Q12)
No. 1 registration roller clutch (CL1)
Paper delivery sensor (Q16)
Tray paper detection (Q19)

※1 1st paper picked up.

※2 2nd paper picked up.

Figure 3-69

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2. Summary of No. 2 Paper Pick-Up Roller

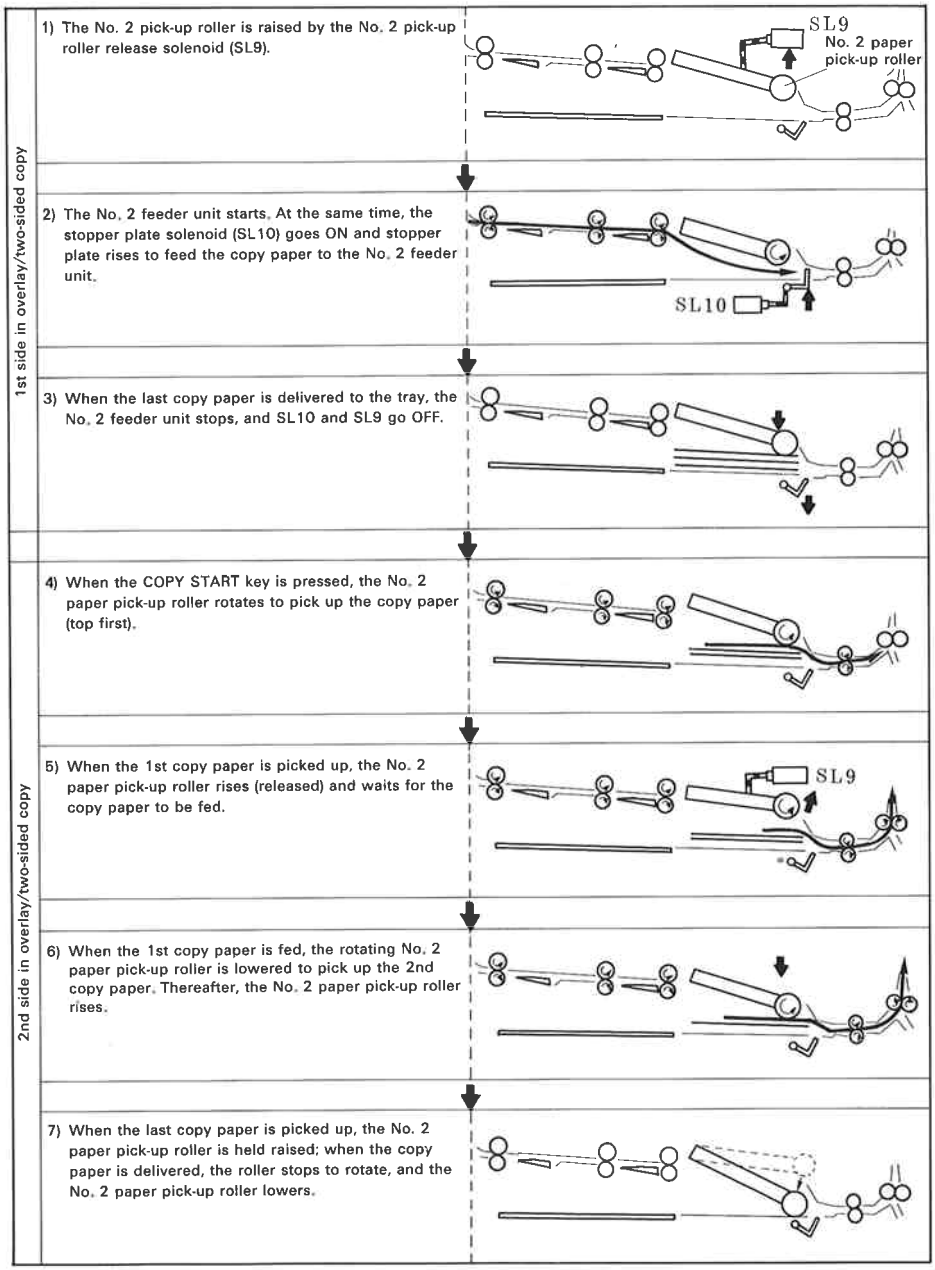
1st side in overlay/two-sided copy
2nd side in overlay/two-sided copy
1) The No. 2 pick-up roller is raised by the No. 2 pick-up roller release solenoid (SL9).
SL9
No. 2 paper pick-up roller
2) The No. 2 feeder unit starts. At the same time, the stopper plate solenoid (SL10) goes ON and stopper plate rises to feed the copy paper to the No. 2 feeder unit.
SL10
3) When the last copy paper is delivered to the tray, the No. 2 feeder unit stops, and SL10 and SL9 go OFF.
4) When the COPY START key is pressed, the No. 2 paper pick-up roller rotates to pick up the copy paper (top first).
5) When the 1st copy paper is picked up, the No. 2 paper pick-up roller rises (released) and waits for the copy paper to be fed.
SL9
6) When the 1st copy paper is fed, the rotating No. 2 paper pick-up roller is lowered to pick up the 2nd copy paper. Thereafter, the No. 2 paper pick-up roller rises.
7) When the last copy paper is picked up, the No. 2 paper pick-up roller is held raised; when the copy paper is delivered, the roller stops to rotate, and the No. 2 paper pick-up roller lowers.

Figure 3-70

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I. Changing the Paper Size in Overlay/Two-Sided Copy Operation

1. Paper Arrangement by Tray Guide Plate

When the COPY START key is pressed in the overlay/two-sided copy mode, the tray motor (M4) starts to rotate in reverse and the tray guide plate moves in the direction of the arrow➡.

The tray motor stops when the light blocking plate of the tray guide plate blocks the home position sensor (Q20). The DC controller PCB sends pulses in numbers suited to the copy paper size to the tray drive motor.

This causes the tray drive motor to rotate in normal direction, and the tray guide plate is moved to the point corresponding to the copy paper size. The tray drive motor then rotates in reverse to stop the tray guide plate at a point about 6 mm away on one side. The tray guide plate waits for the copy paper at the point.

When the copy paper reaches the tray, the tray drive motor rotates in normal direction moving the guide plate 6 mm and then rotates in reverse direction moving the guide plate 6 mm, thereby arranging the copy paper in order.

When the last copy reaches the tray, the tray drive motor rotates in normal, reverse, and normal direction in preparation for the second side of the copy paper.

During copy operation for the second side, the tray drive motor is not activated and is held standing by until copy operation for the first side of the next copy paper starts.

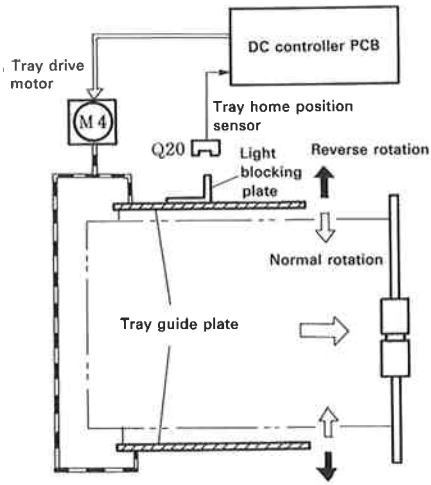

Figure 3-71 Tray (top view)

During copy operation for the second side, the tray drive motor is not activated and is held standing by until copy operation for the first side of the next copy paper starts.

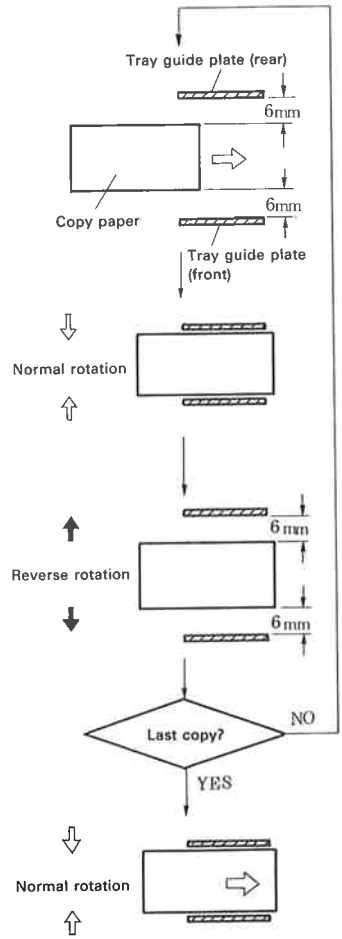

Figure 3-72 Arrangement of Paper

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2. Changing the No. 2 Feeder Unit Paper Path

When the COPY START key is pressed in the two-sided or overlay copy mode, the DC controller PCB sends the paper deflector solenoid drive command (DPSD3, DPSD4) suited to the copy paper size.

The commands turn the solenoid (SL7 or SL8) ON, and the large-size or medium-size paper deflector is activated to change the paper path for the copy paper.

No. in Figure 3-73	1	2	3
Copy paper length	220 mm or less	221 mm to 306 mm	307 mm or more
SL7	OFF	OFF	ON
SL8	OFF	ON	OFF

Table 3-16

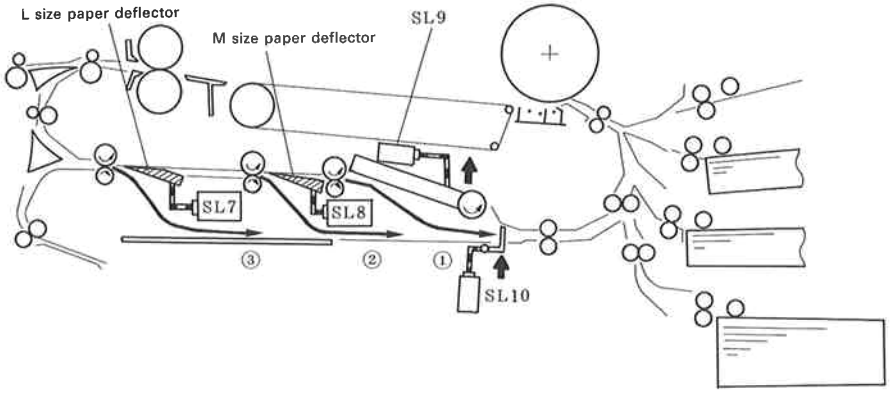

Figure 3-73

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J. Fixing Assembly and Delivery Unit

1. Outline

The upper and lower rollers of the fixing assembly and the paper delivery roller of the paper delivery unit are driven by the main motor.

The upper roller is equipped with a heater(s), which heats the upper roller.

The thermistor (TH1) detects the fixing temperature, and the DC controller PCB controls the heater(s) so that the surface temperature of the upper roller is of the specified value.

Main heater (H1): 820 W
Sub heater (H2): 350 W

■ 45 min or more after power switch ON
Control temperature (standby) ..... 190 °C
Control temperature (copy operation)..... 195 °C
Control temperature (warm-up)..... 185 °C

■ 45 min or less after power switch ON
Control temperature (standby) ..... 195 °C
Control temperature (copy operation)..... 200 °C
Control temperature (warm-up)..... 190 °C

Continuous copy operation will be stopped if the surface temperature of the upper roller of the fixing assembly falls below 160 °C. The upper roller is heated to the specified value with the operation suspended.

When the temperature reaches the specified value, 'COPY READY' is indicated on the control panel, and copy operation can be resumed by a press on the COPY START key.

The cleaning belt used to clean the upper roller of the fixing assembly is taken up by the cleaning belt winding arm, which is moved up and down by the eccentric cam driven by the cleaning belt motor (M5).

A detection lever and two photointerrupters (Q28, Q29) are provided to detect the remaining length of the cleaning belt.

Note:
The pre-heat mode controls the temperature of the fixing assembly by maintaining it 5°C lower than normal.

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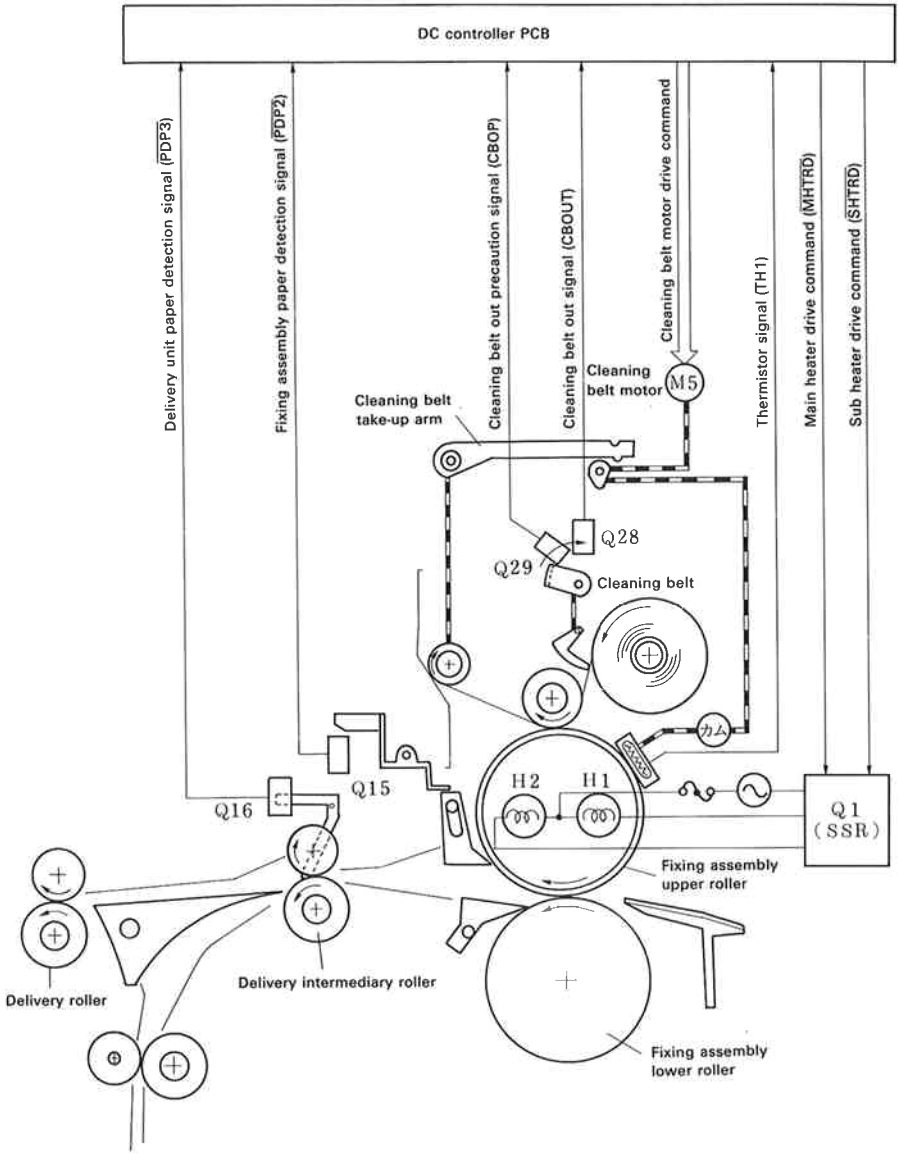

Figure 3-74

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2. Detection of Cleaning Belt

The cleaning belt is provided with a cut at two points, and its remaining length is detected mechanically by the cleaning belt detection lever (see Figure 3-75).

When the cleaning belt detection lever detects the cuts, a warning message is indicated on the control panel.

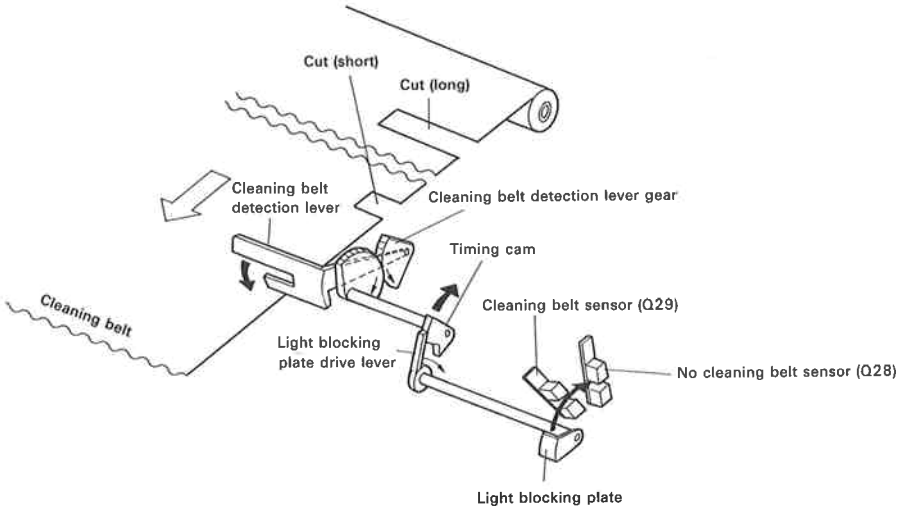

Figure 3-75

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Figure 3-76 shows the spatial relationship of parts (light blocking plate and others) when the short and long cuts in the cleaning belt are detected.

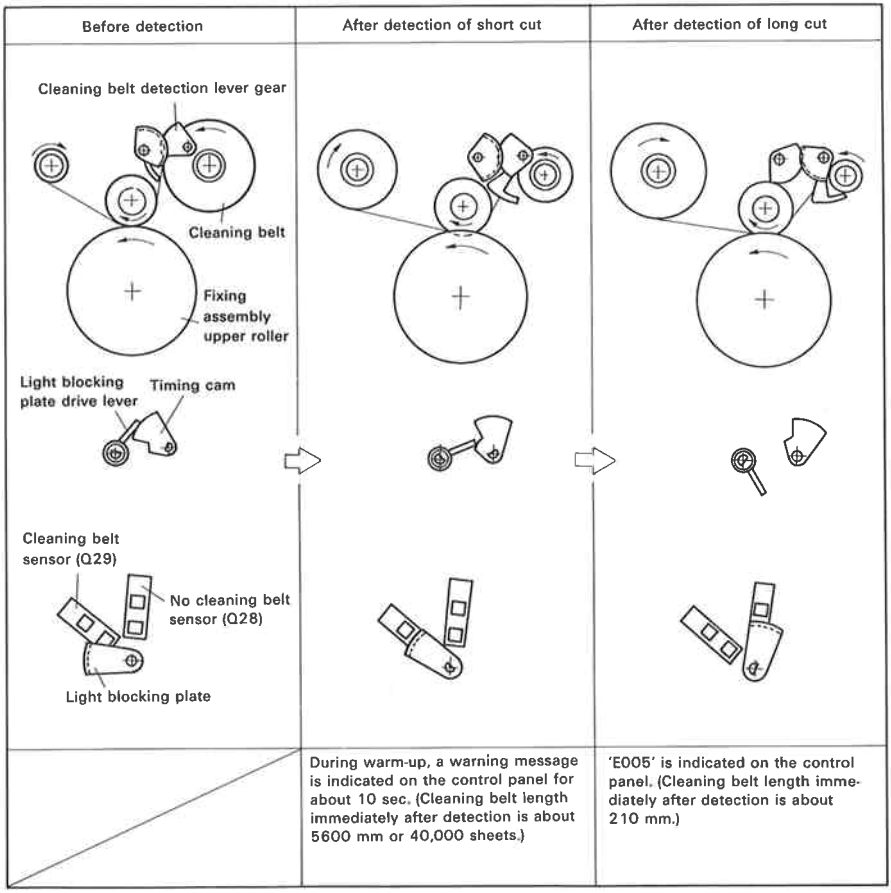
Before detection
After detection of short cut
After detection of long cut
Cleaning belt detection lever gear
Cleaning belt
Fixing assembly upper roller
Light blocking plate drive lever
Timing cam
Cleaning belt sensor (Q29)
No cleaning belt sensor (Q28)
Light blocking plate
During warm-up, a warning message is indicated on the control panel for about 10 sec. (Cleaning belt length immediately after detection is about 5600 mm or 40,000 sheets.)
'E005' is indicated on the control panel. (Cleaning belt length immediately after detection is about 210 mm.)

Figure 3-76

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3. Reciprocating Mechanism of the Thermistor

The thermistor is moved back and forth in the axial direction of the upper roller of the fixing assembly to prevent damage to the roller. This movement is called "reciprocating mechanism."

The thermistor is moved at small intervals of 10 mm by the belt cleaning motor.

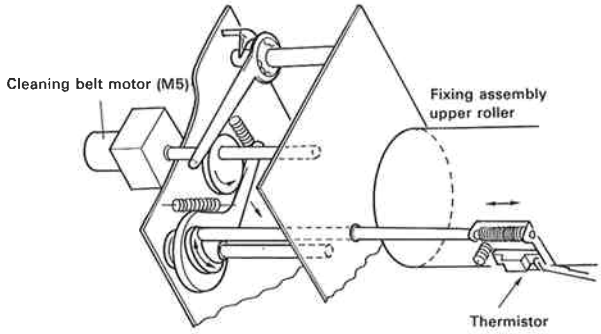

Figure 3-77

4. Reciprocating Mechanism of Upper Separation Claws

The five upper separation claws are moved back and forth at the same time in the axial direction of the fixing assembly upper roller to prevent damage to the roller (reciprocating mechanism).

The upper separation claws are moved by drive from the main motor (M1) transmitted through gears.

The upper separation claws are moved at small intervals of 3mm, and they make a round trip for each 50 copies made.

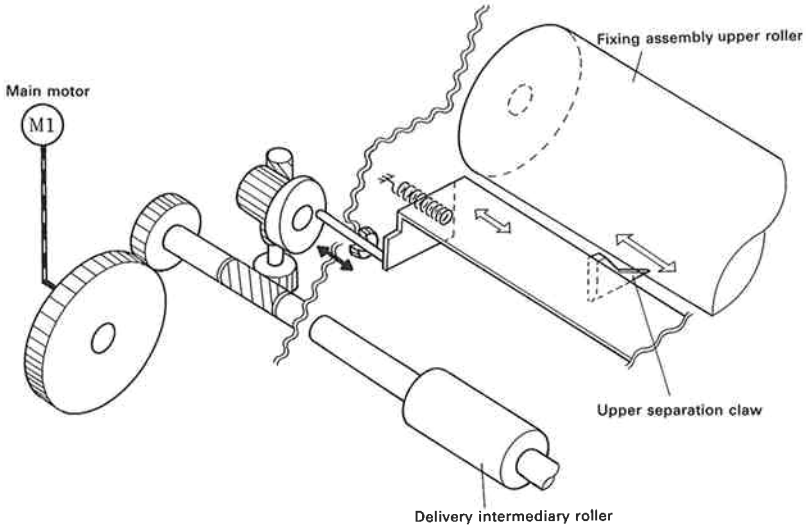

Figure 3-78

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5. Sequence for Fixing Assembly

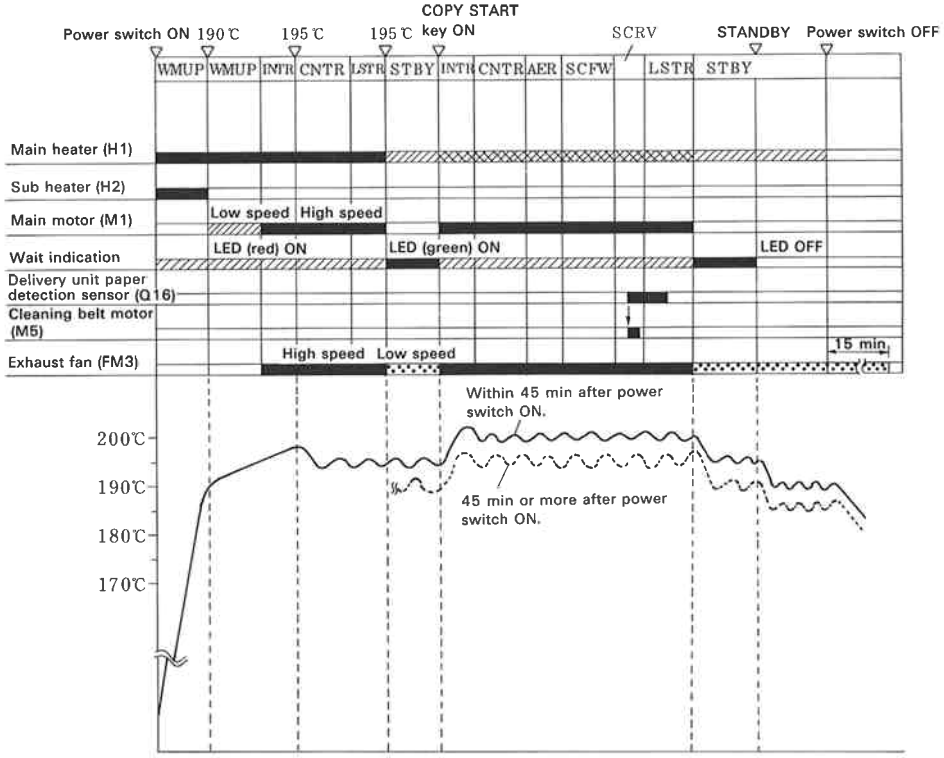

Figure 3-79

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K. Jam Detection

1. Timing for Jam Detection

The paper detect sensors shown in Figure 3-80 are provided to check whether copy paper is fed normally.

Detection of a jam is based on whether there is paper at the sensors when the microprocessor sends timing signals.

When the microprocessor identifies a jam, the copy operation is stopped, main motor is stopped, and the fixing heaters are turned OFF.

The microprocessor identifies a jam in the following conditions.

① Copy paper has jammed at either of the sensors when the power switch is turned ON.
② Copy paper has jammed at the fixing assembly paper detection sensor (Q15) during copy operation (fixing assembly stationary jam).
③ Copy paper fails to reach the No.1 pre-registration (roller) paper detection sensor within the specified period of time (No.1 registration roller delay jam).
④ Copy paper fails to reach the paper delivery detection sensor within the specified period of time (output delay jam).
⑤ Copy paper fails to pass the paper delivery detection sensor within the specified period of time (output stationary jam).
⑥ Copy paper fails to reach the paper feed sensor within the specified period of time (paper deck pick-up delay jam).
⑦ Copy paper fails to pass the paper feed sensor within the specified period of time (paper deck pick-up stationary jam).

■ NP-6650 only

① Copy paper fails to reach the copy inverter detection sensor within the specified period of time (copy inverter delay jam).
② Copy paper fails to pass the copy inverter detection sensor within the specified period of time (copy inverter stationary jam).
③ Copy paper fails to reach the No. 2 feeder unit input paper detection sensor within the specified period of time (input delay jam).
④ Copy paper fails to pass the No. 2 feeder unit input paper detection sensor within the specified period of time (input stationary jam).
⑤ Copy paper fails to reach the NO.2 Pre-registration (roller) paper detection sensor within the specified period of time (No.2 registration roller delay jam.)

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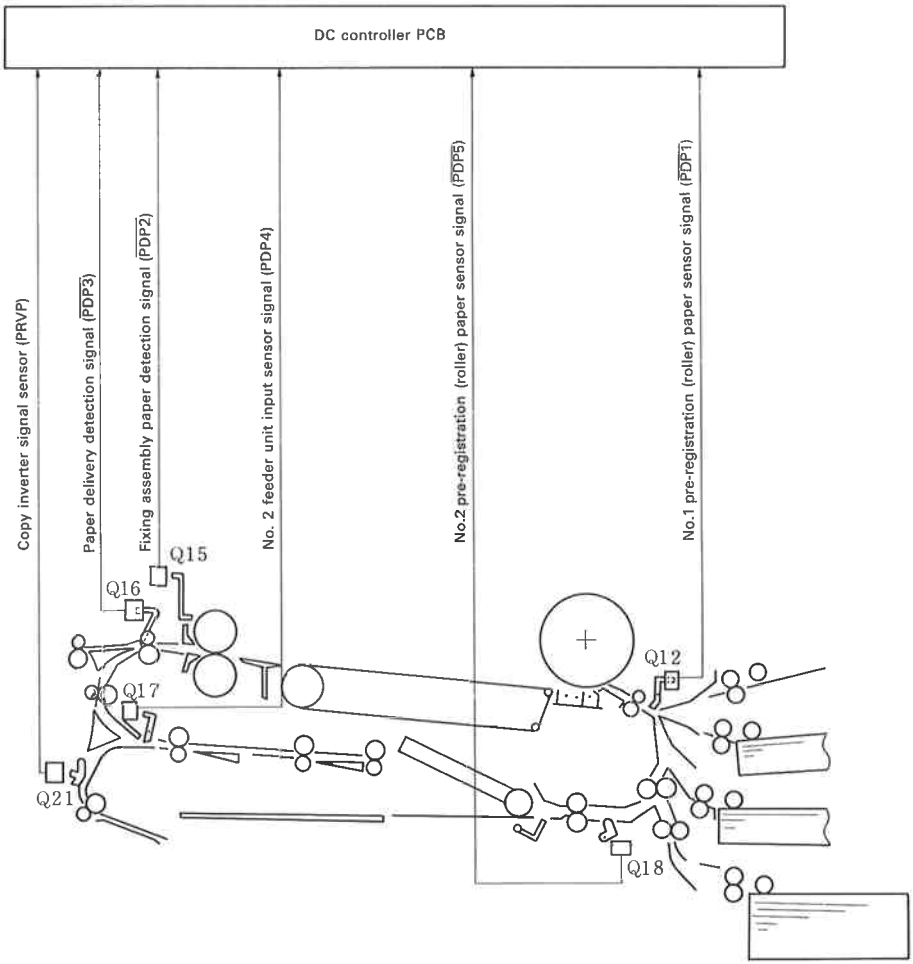

Figure 3-80

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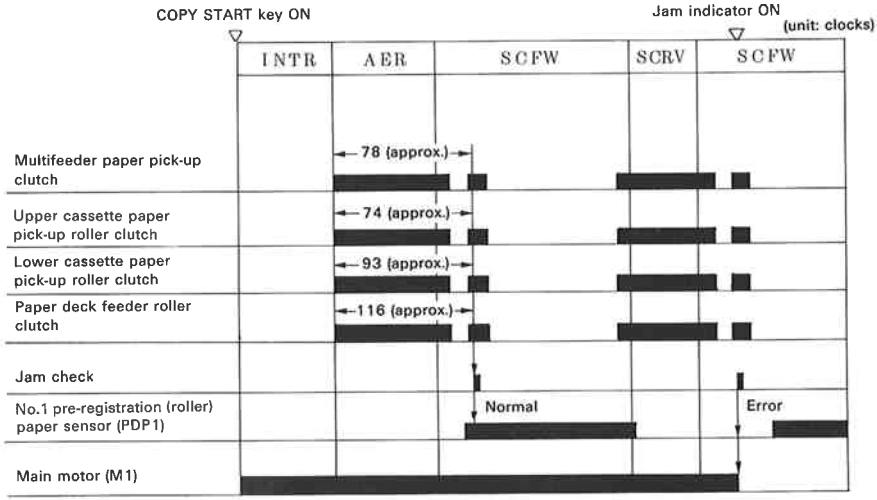

Figure 3-81 No. 1 Registration Roller Delay Jam

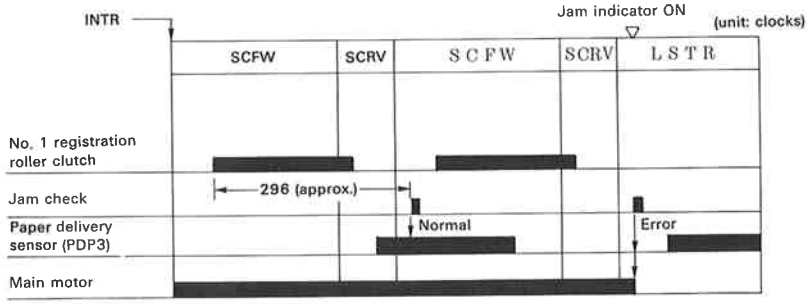

Figure 3-82 Output Delay Jam

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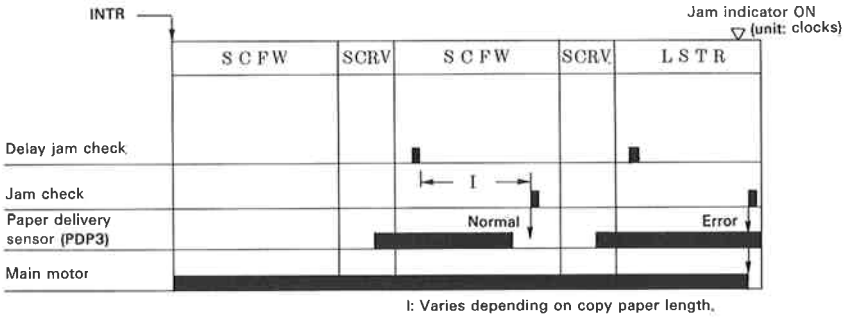


I: Varies depending on copy paper length.

Figure 3-83 Output Stationary Jam

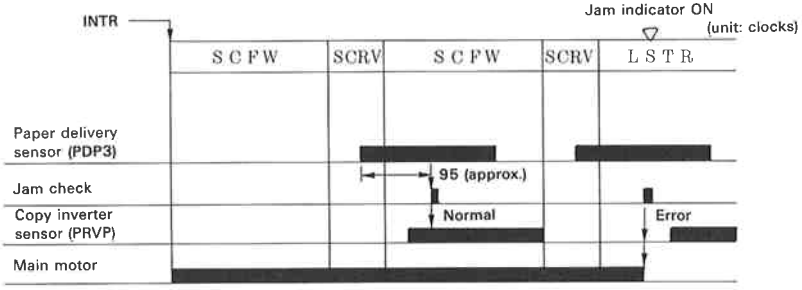
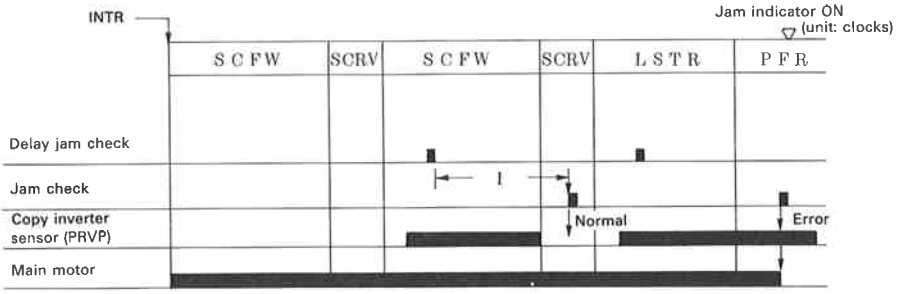


Figure 3-84 Copy Inverter Delay Jam



I: Varies depending on copy paper length.

Figure 3-85 Copy Inverter Stationary Jam

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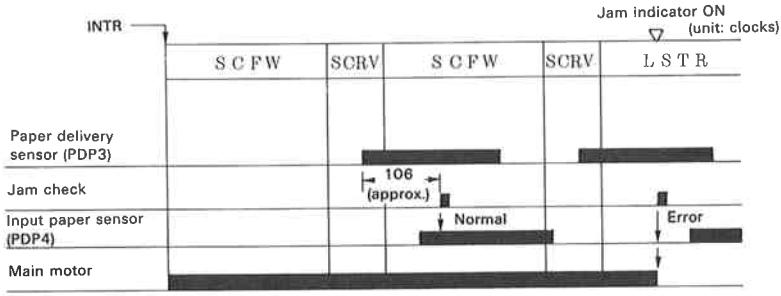


Figure 3-86 Input Delay Jam (overlay copies)

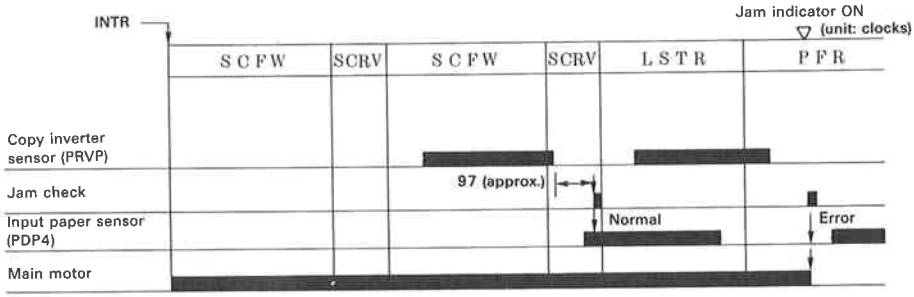
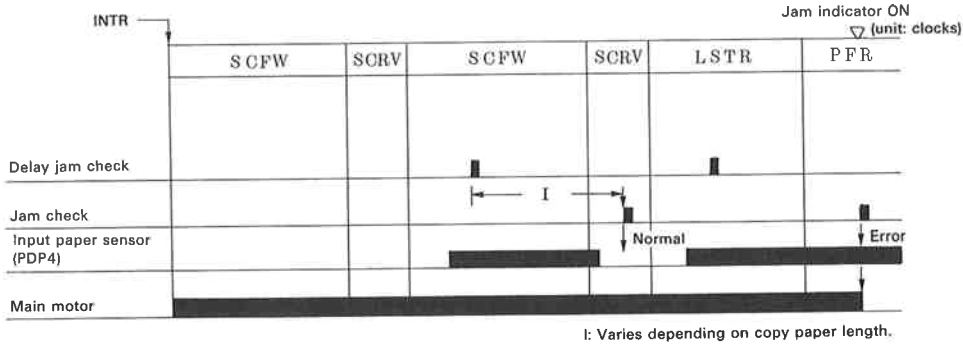


Figure 3-87 Input Delay Jam (two-sided copies)



I: Varies depending on copy paper length.

Figure 3-88 Input Stationary Jam

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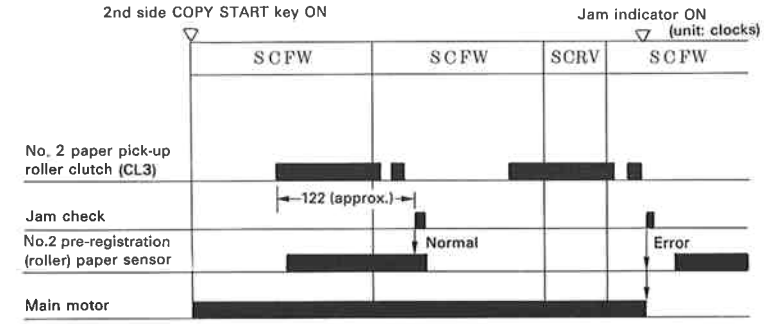


Figure 3-89 No. 2 Registration Roller Delay Jam

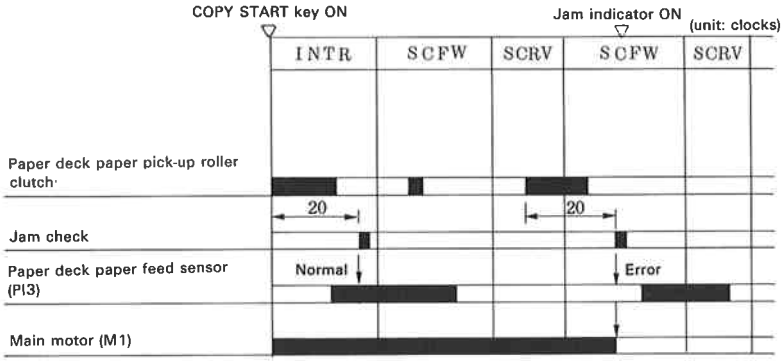
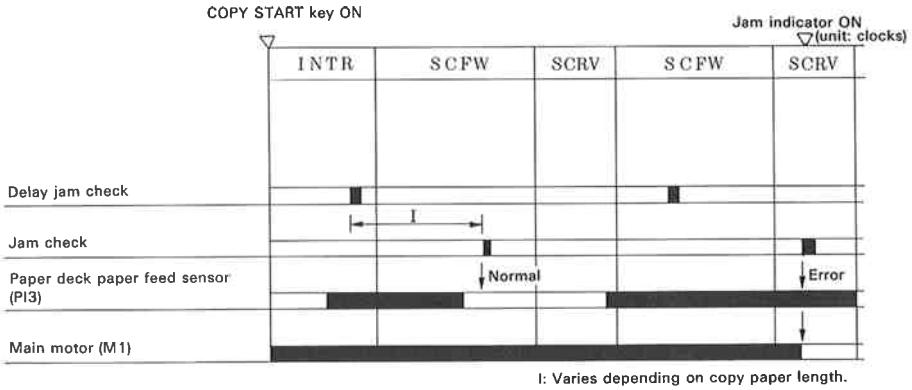


Figure 3-90 Paper Deck Pick-Up Delay Jam



I: Varies depending on copy paper length.

Figure 3-91 Paper Deck Pick-Up Stationary Jam

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2. Jam Indication

When a jam occurs, the LED on the jam location display corresponding to the possible location of the jam is turned ON.

Jam location	LED ON location
No. 1 registration roller delay/stationary jam	1
Output delay jam	3
Output stationary jam	4
Copy inverter delay jam	4
Copy inverter stationary jam	5
Input delay jam	5
Input stationary jam	6
No. 2 registration roller delay/stop jam	7
Paper deck delay/stationary jam	2

Table 3-17

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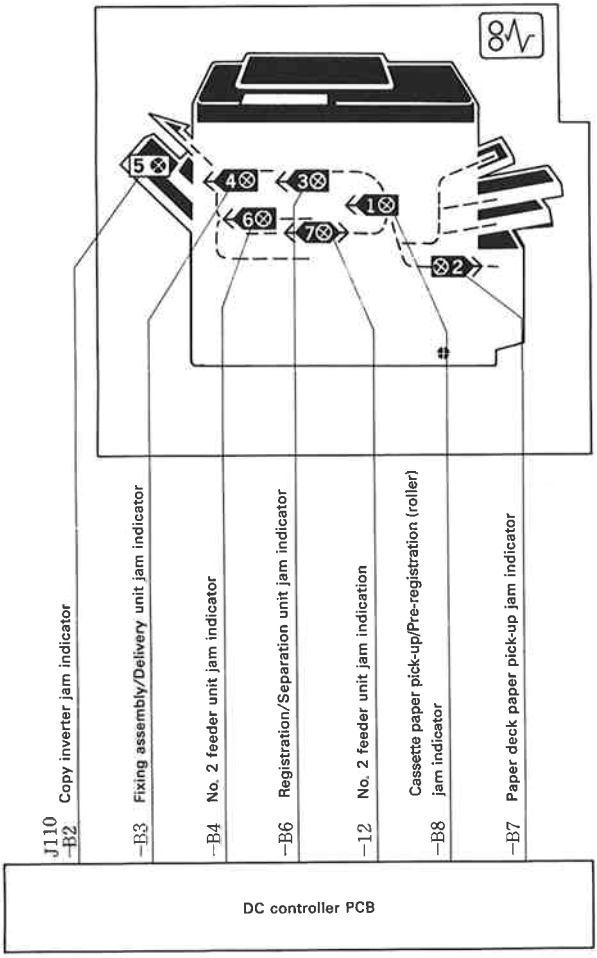

Figure 3-92

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V. POWER SUPPLY

A. Power Circuitry

The copier has two DC power supply PCBs; PU1 supplies the copier with power, and PU2 supplies power to the RDF-II, D-ADF, and sorter.

The DC power PCB (PU1) is supplied with 5V DC as long as the power plug is connected to the outlet.

The 5V DC keeps the microprocessor on the DC controller PCB supplied with power even if the door switch or delivery unit switch goes OFF because of a jam or other problems, thereby keeping the memory of the microprocessor intact.

When the power plug is disconnected, the lithium battery provided on the DC controller PCB serves to keep the memory.

The AC line input of both DC power PCBs (PU1, PU2) is provided with a fuse, and the stablizing power circuit is provided with an over-current protection circuit. If any of the power lines of the copier is subjected to an over-current because of a short-circuit or other problems, the protection circuit is activated to turn the output of the power unit OFF. The copier can be reset by disconnecting the plug, removing the cause of the activation, and turning the power ON.

Note:
If the output of the copier is subjected to an over-current, the protection circuit will be activated before the AC input fuse melts. If the AC power of the power unit is turned ON and OFF repeatedly with its output shorted, however, the protecting circuit may fail to keep up with the operation, and the AC input fuse may start to melt.

The DC power PCB (PU1) of the copier is controlled by the AC power and remote control signal.

a. Control by AC Power
If the front door switch and paper delivery unit switch are OFF (open), power except 5V DC will not be available.

b. Control by Remote Signal
When the power switch is OFF, power except for the main motor and developing assembly clutch will not be available.

B. Power for Date and Time Indications

A lithium battery is provided so that the date and time indications will not go out even when the power plug is disconnected.

The lithium battery has a life of about five years with the power plug disconnected.

When the lithium battery is exhausted with the power plug disconnected, the date and time indications will remain the same. The counts start once again when the plug is connected.

start once again when the plug is connected.

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C. Diagram of Power Supply

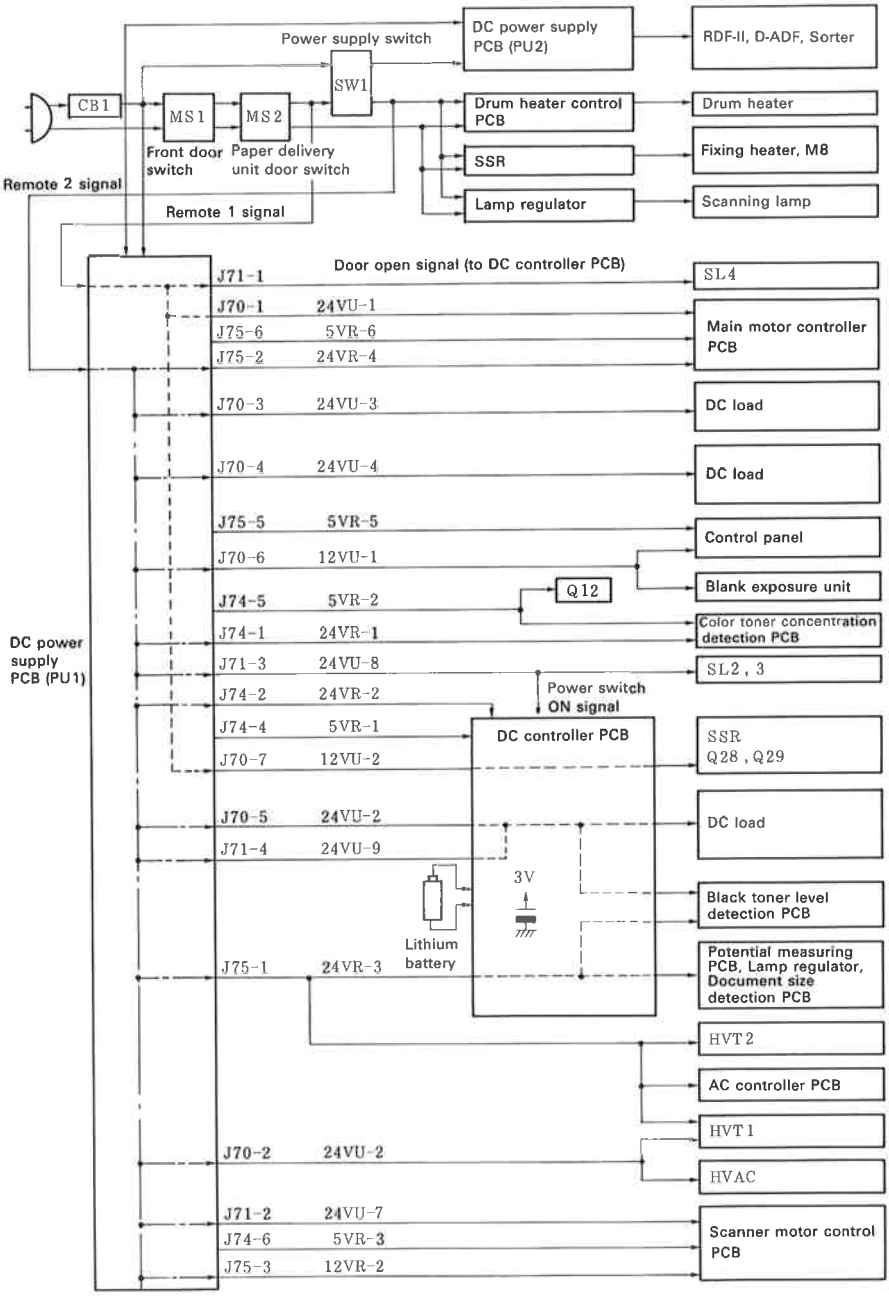

Figure 3-93

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VI. Editor

A. Outline

1. Electrical Circuit

The editor is electrically controlled by the editor controller PCB. The editor controller PCB is a microprocessor and, according to the programs stored in advance, it reads points pressed by a cordless pen on a plane-shaped resistor and sends signals to the copier as necessary.

2. Communication with Copier

The transmission of signals between the editor and copier is in serial (see Figure 3-94). The power for the editor comes from the copier, and 5V DC is converted to 3.5V DC.

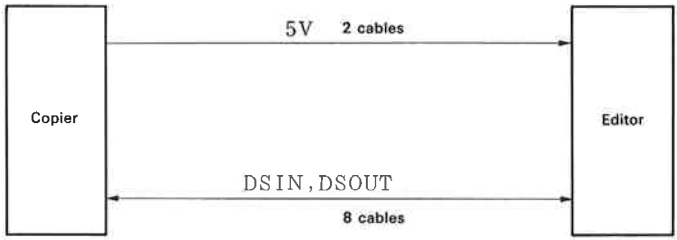

Figure 3-94

3. Input to and Output from Editor Controller PCB

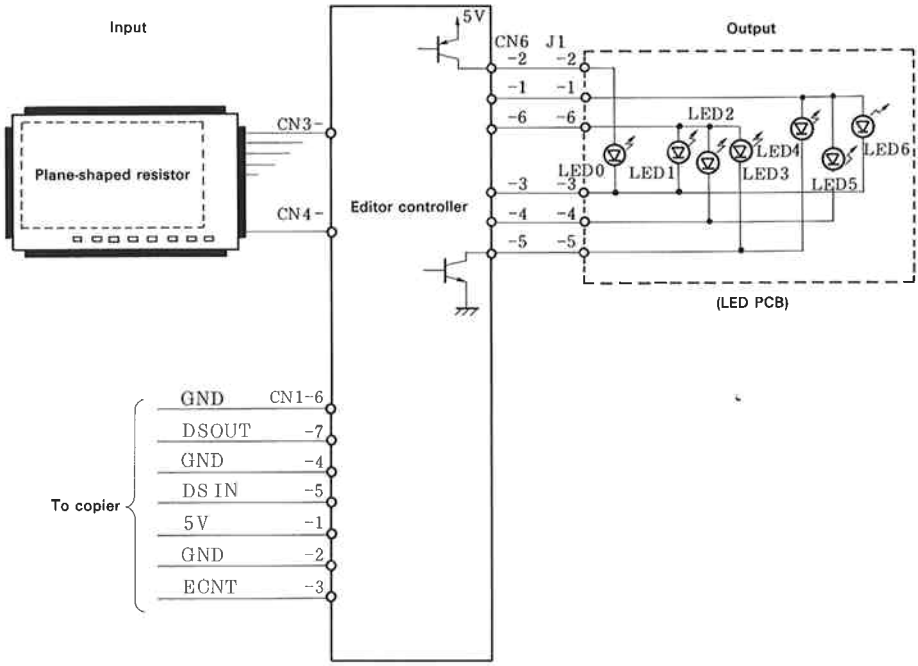

Figure 3-95

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4. Basic Construction of Editor

The editor consists of a tablet and a cordless pen.

Figure 3-96 shows the basic construction of the tablet. As in Figure 3-96A, the tablet is composed of several layers; i.e., from top to bottom, a protection sheet, X plane-shaped resistor, Y plane-shaped resistor, and fixed plate.

The Y plane-shaped resistor is provided with bosses called dot spacers. The dot spacers are arranged over the Y plane-shaped resistor and serve to prevent contact between the X and Y plane-shaped resistors without pressure on the tablet.

The tablet is located below the sheet on which documents will be placed; it is also found below the editor control panel over which the CLEAR and MEMORY keys, four IMAGE CONVERSION keys and others are found.

The editor controller reads the points pressed by the cordless pen in terms of area designation values or input by the above keys.

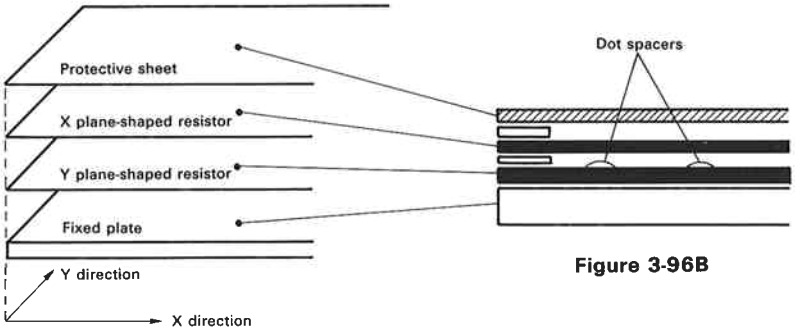

Figure 3-96A

Figure 3-96B

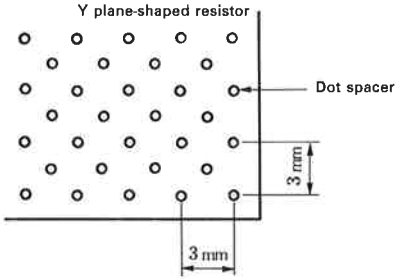

Figure 3-96C

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B. Electrical Circuit

1. Reading the Input Operations

The editor detects presses made by the cordless pen as follows:

Figure 3-97 shows the equalization circuit of the comparator. (SW1 is ON; SWs 2 through 4 are OFF.)

The negative side of the comparator receives voltages pressure-divided over resistances Ra, Rb, Rc, and Rd (Rc is contact resistance).

The reference value of the comparator, on the other hand, is set by pressure divided over resistances R1 and R2 and sent to the positive side.

When the tablet is pressed with a pressure greater than that specified and contact resistance Rc decreases in response, the voltage to the negative side increases.

This causes output Vo of the comparator to go from H to L, and the microprocessor recognizes a press by the cordless pen.

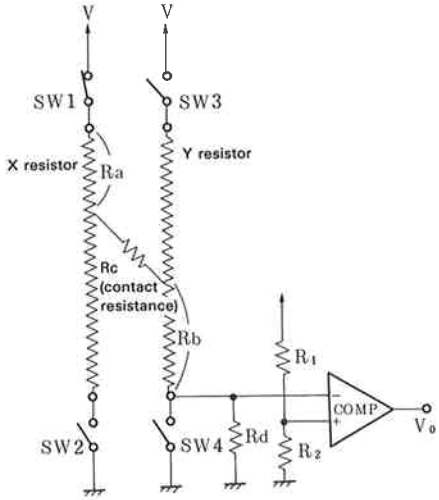

Figure 3-97 Equilization Circuit of Comparator

2. Reading X Coordinates

Figure 3-98 shows the equalization circuit of the tablet. (SW1 and SW2 are ON; SW3 and SW4 are OFF.)

The switches are shifted as in Figure 3-98 to guide the pressure division of resistances Ra and Rb to the A/D converter so that the microprocessor identifies the X coordinates.

As the input impedance of the A/D converter is appreciably large, the variation of Rc (contact resistance) will not affect the X coordinates.

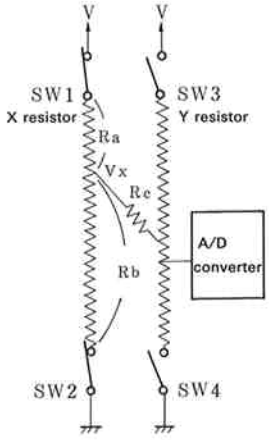

Figure 3-98 Reading X Coordinates

3. Reading Y Coordinates

The switches are shifted as in Figure 3-99 (SW1 and SW2 are OFF; SW3 and SW4 are ON) to read the Y coordinates the same way as X coordinates.

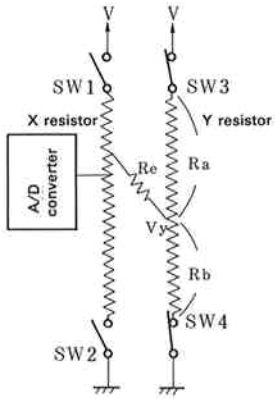

Figure 3-99 Reading Y Coordinates

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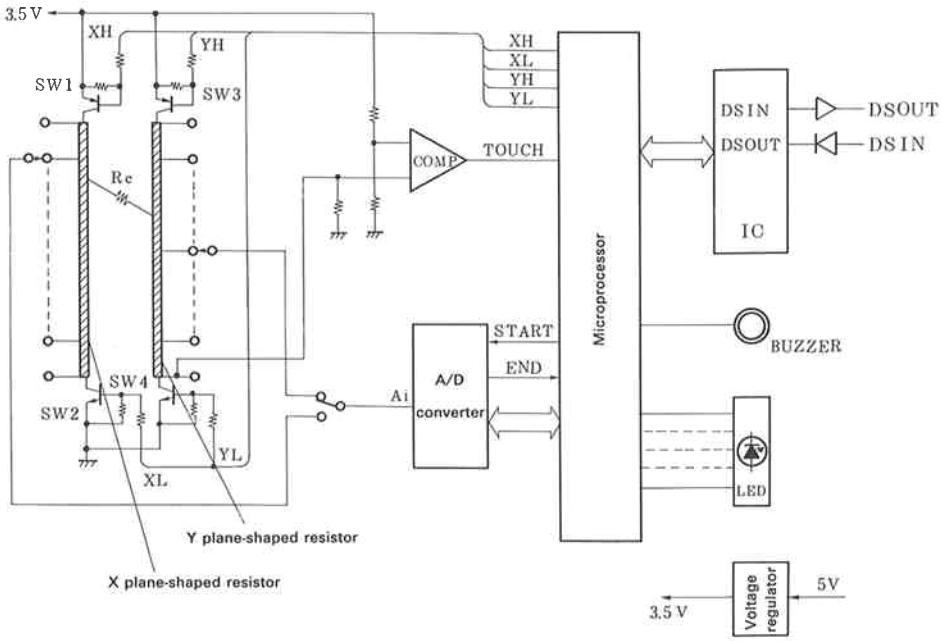

Figure 3-100 Tablet and Editor Controller

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VII. SERVICE MODE

A. Outline

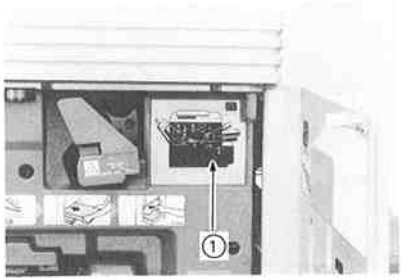
The service mode of the copier is classified into the following six:

Item	Description
☒ 1 ☒	Display mode
☒ 2 ☒	I/O display mode
☒ 3 ☒	Adjustment mode
☒ 4 ☒	Function (Operation/Inspection) mode
☒ 5 ☒	User option mode
☒ 6 ☒	Counter mode

Table 3-18

B. Operation of the Service Mode

1) Open the front door, and insert the door switch actuator. To check 'I/O DISPLAY' mode and others while making copies, select the copy mode.
2) Push the service mode switch (SW901 on the jam indication PCB) with a hex key or the like.
   - The copier enters the service mode and displays 'S' at the upper left corner of the message display.



① Hole

Figure 3-100

3) Enter the No. of the mode for checks or adjustments with the ☒ key and input keys (see Table 3-18).

   EX. ☒ → 3 → ☒

4) Press the ↓ key and ↑ key to select the screen.
5) Make a check or adjustments.
6) Press the RESET (⎚) key twice to clear the service mode.

C. Adjustment Mode and Function Mode

The adjustment and function modes serve the same purpose as conventional VRs and SWs by storing the information specified from the operation control into the RAM on the DC controller PCB.

Note the label behind the front door of the copier. Each copier is pre-adjusted at the factory and the adjustment values are recorded on the label.

The DC controller PCB of the service parts contains standard values; therefore, it is necessary to enter the values shown on the label when the DC controller PCB is replaced or the RAM is initialized. Further, it is important to record all new values entered in the field on the label.

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D. Display Mode (☒ 1 ☒)

Select the screen with the ↑ and ↓ keys.

☒ 1 ☒ DISPLAY			
DPOT	: 430V	VAE	: 200V
VL1T	: 180V	VL1M	: 175V
		VL2M	: 075V
VDT	: 450V	VDM	: 460V

4A — Latch data of document detection 0

78 — Latch data of document detection 1

32 — Latch data of document detection 2

Item	Description	Remarks
D POT	Drum surface potential	unit: V
VL1 T	VL1 (light area potential) target value	
VD T	VD (dark area potential) target value	
VAE	Average surface potential at time of AE measurement	
VL1 M	VL1 (light area potential) measurement value	
VL2 M	VL2 (light area potential for developing bias) measurement value	
VD M	VD (dark area potential) measurement value	

☒ 1 ☒ DISPLAY			
L100	: 0621V		:
L115	: 0690V	PLMT	: 0
L220	: 1324V	LLMT	: 0
L240	: 1449V	TEMP	: 185°C

35 — Slice level of document detection 0

52 — Slice level of document detection 1

47 — Slice level of document detection 2

Item	Description	Remarks
L100 L115 L220 L240	Scanning lamp ON voltage L100: 100V machine L115: 115V machine L220: 220V machine L240: 240V machine	0621 V represents 62.1 V.
PLMT	'1' is indicated if the current value reaches the upper or lower limit at time the current of the primary corona is controlled.	0: normal 1: limit
LLMT	'1' is indicated when the ON voltage for the scanning lamp reaches upper or lower limit.	0: normal 1: limit
TEMP	Surface temperature of the fixing assembly upper roller	unit: °C

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☒1☒ DISPLAY			
ED_X	: 210 mm	ED_Y	: 297 mm
PC	: 1000A	SC	: -100A
PTC	: -200A	BIAS	: 180V
TC	: 800A	ERR	: Oxxx

Item	Description	Remarks
ED-X ED-Y	Indicates the coordinates enterd from the NP editor. ED-X: X direction ED-Y: Y direction	unit: mm
PC	Current value of the primary corona unit	
PTC	Current value of the pre-transfer corona unit	
TC	Current value of the transfer unit	
SC	Current value of the separation corona unit	
BIAS	DC value of the developing bias	unit: V
ERR	most recent error (E) code	

☒ 1 ☒DISPLAY			
Q114	: 01.01	Q113	: 01.07
Q242	: 01.03	BJAM	: 0000
DF	: 01.04	FJAM	: 0000
SORT	: 01.04	SJAM	: 0000

Item	Description	Remarks
Q114	Indicates the version No. of the ROMs (Q114, Q115) on the DC controller PCB.	
Q242	Indicates the version No. of the sub CPU (Q242) on the DC controller PCB.	
DF, SORT	Indicates the version No. of the CPU on the controller PCB of the feeders and sorters.	
Q113	Indicates the version No. of the ROM (Q113) on the DC controller PCB.	
B JAM	Indicates the location of jams inside the copier.	See Table 3-19.
F JAM	Indicates the location of jams in the feeder unit of the RDF-II, D-ADF and others.	See Table 3-20.
S JAM	Indicates the location of jams in the sorter.	See Table 3-21.

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No.	Type of jam
0001	No. 2 registration roller (Q18) delay jam
0002	No. 2 registration roller (Q18) stationary jam
0004	Deck (PI3) delay jam
0008	Deck (PI3) stationary jam
0010	No. 1 registration roller (Q12) delay jam
0020	No. 1 registration roller (Q12) stationary jam
0040	Fixing assembly (Q15) stationary jam
0080	Paper delivery (Q16) delay jam
0100	Paper delivery (Q16) stationary jam
0200	Copy inverter (Q21) delay jam
0400	Copy inverter (Q21) stationary jam
0800	Inlet (Q17) delay jam
1000	Inlet (Q17) stationary jam

Table 3-19 Jams in the Copier

No.	Type of jam
01	Paper folding sensor delay jam
02	Paper folding sensor stationary jam
03	Paper detection sensor delay jam
04	Paper detection sensor stationary jam
05	Paper detection sensor timing jam
06	Stapler jam
07	When the sensor detects paper at time of power ON.
08	When the joint switch or cover switch is turned OFF during copy operation.
0AH	Staple tray stationary jam
0BH	Staple safety mechanism activated

Table 3-20 Jams in the Sorter

Code	Jam
01	The document has been pulled out during its pick-up.
02	Delay; pick-up sensor.
03	Delay; registration/skew sensor.
04	Skew, leaading edge; registration/skew sensor.
05	Stationary; registration/skew sensor.
06	Double feeding; registration/skew sensor.
07	Skew, trailing edge; registration/skew sensor.
09	Bend,leading edge; registration/skew sensor.
11	Delay 1; reversal sensor.
12	Stationary; reversal sensor.
13	Delay 2; reversal sensor.
20	Stationary, initial; reversal sensor.
21	Delay; registration/skew sensor.
22	Skew, leading edge; registration/skew sensor.
23	Stationary, reversal/pick-up; registration/skew sensor.
24	Skew, trailing edge, reversal; registration/skew sensor.
26	Bend, leading edge, pick-up; registration/skew sensor.
41	Delay, delivery sensor.
42	Stationary; delivery sensor.
81	Open; door/cover.
82	Open; pick-up tray/upper cover.
83	The document sensor has not detected the document to be delivered.
84	The sensor has detected a document during a pick up.
85	A jam peculiar to the test mode has occurred
86	The tray guide width is smaller than the document to be delivered during delivery.
87	Double feeding of documents has been detected when the detection mechanism is activated.
88	A document remaining from the preceding cycle has been detected when the first document of a new cycle was picked up.
89	The recycle bar has failed while the document was being cycled (2nd cycle and thereafter).

Table 3-21 Jams in DF

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E. I/O Display Mode (☒ 2 ☒)

Select the screen with the ↑ and ↓ keys. Input or output equivalent to a total of 16 bits can be checked with a single screen.

☒2☒ I/O DISPLAY
P001 : 0100110001111000B

☒2☒ I/O DISPLAY
P050 : 74

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Address	bit	Description	Signal	Jack No.	Remarks
P001 (input)	1	For factory adjustment.	—	J106-B11	—
	2	For factory adjustment.	—	J106-B12	—
	3	No. 2 registration roller (Q18) signal	$\overline{\text{PDP5}}$	J105-B8	0: Paper present.
	4	Paper deck paper feed sensor (PI3) signal	PDP7	J105-A10	1: Paper present.
	5	No. 1 registration roller paper sensor (Q12) signal	$\overline{\text{PDP1}}$	J101-B14	0: Paper present.
	6	Paper delivery sensor (Q16) signal	$\overline{\text{PDP3}}$	J106-B2	0: Paper present.
	7	Copy inverter sensor (Q21) signal	PRVP	J106-A1	1: Paper present.
	8	No. 2 feeder unit input paper sensor (Q17) signal	PDP4	J106-B3	1: Paper present.
	9	Fixing assembly paper sensor (Q15) signal	$\overline{\text{PDP2}}$	J106-B1	0: Paper present.
	10	Multifeeder paper sensor (Q22) signal	$\overline{\text{MFS}}$	J109-B13	1: Paper present.
	11	Upper cassette paper sensor (Q24) signal	$\overline{\text{UPEP}}$	J109-B7	1: Paper present.
	12	Lower cassette paper sensor (Q26) signal	$\overline{\text{LPEP}}$	J109-A7	1: Paper present.
	13	Holding tray paper sensor (Q19) signal	$\overline{\text{PDP6}}$	J105-B7	0: Paper present.
	14	Paper deck paper sensor (PI1) signal	PCEP	J105-A2	0: Paper present.
	15	Not used.	—	—	—
	16	Not used.	—	—	—
P002 (output)	1	Upper lifter clutch (CL6) drive command	$\overline{\text{ULTCD}}$	J108-5	1: CL6 ON
	2	Upper paper pick-up roller clutch (CL5) drive command	$\overline{\text{UPUCD}}$	J109-B1	1: CL5 ON
	3	Upper paper pick-up roller release solenoid (SL15) drive command	$\overline{\text{UPRSD}}$	J109-A11	1: SL15 ON
	4	Lower lifter clutch (CL8) drive command	$\overline{\text{LLTCD}}$	J108-8	I: CL8 ON
	5	Lower paper pick-up roller clutch (CL7) drive command	$\overline{\text{LPUCD}}$	J109-A1	1: CL7 ON
	6	Lower paper pick-up roller release solenoid (SL16) drive command	$\overline{\text{LPRSD}}$	J109-A9	1: SL16 ON
	7	Paper deck paper pick-up roller clutch (PCL1) drive command	$\overline{\text{PUCD}}$	J105-A5	1: PCL1 ON
	8	Paper deck feed roller clutch (PCL2) drive command	$\overline{\text{FCD}}$	J105-A6	1: PCL2 ON
	9	Paper deck lifter drive ready command	$\overline{\text{LIDE}}$	J105-A1	1: Lifter ascent ready
	10	Multifeeder paper pick-up roller clutch (CL5) drive command	$\overline{\text{MPUCD}}$	J109-B9	1: CL5 ON
	11	Multifeeder lifter solenoid (SL14) drive command	$\overline{\text{MLTSD}}$	J108-2	1: SL14 ON
	12	No. 2 feed roller clutch (CL3) drive signal	$\overline{\text{DPUCD}}$	J105-B4	1: CL3 ON
	13	No. 2 registration roller clutch (CL2) drive command	$\overline{\text{RGCD2}}$	J105-B5	1: CL2 ON

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Address	bit	Description	Signal	Jack No.	Remarks
	14	Paper stopper plate solenoid (SL10) drive command	$\overline{PSS}$	J105-B3	1: SL10 ON
	15	No. 2 paper pick-up roller release solenoid (SL9) drive command	$\overline{DPRSD}$	J106-B4	1: SL9 ON
	16	Roller electrode bias drive command	$\overline{ROED}$	J101-A1	1: Bias ON
P003 (output)	1	Medium-size paper deflector drive solenoid (SL8) drive command	DPSD4	J105-B2	1: SL8 ON
	2				
	3	Large size paper deflector drive solenoid (SL7) drive command	DPSD3	J105-B1	1: SL7 ON
	4				
	5	Buzzer ON command	—	J114-A5	1: Buzzer ON
	6	Not used.	—	—	—
	7	—	—	—	—
	8	LED101 ON command	—	—	1: LED101 ON
	9	Copy inverter solenoid (SL5) drive command	$\overline{RVSD}$	J106-B7	1: SL5 ON
	10	Pre-transfer/Separation AC component ON command	$\overline{ACON}$	J102-A9	1: AC component ON
	11	Developing bias AC bias ON command	$\overline{ACBTP}$	J101-A2	1: AC bias ON
	12	Not used			
	13	Pre-conditioning lamp (LA2) ON command	$\overline{PEXP}$	J111-A4	1: LA2 ON
	14	Not used			
	15	Fixing assembly main heater (H1) drive command	$\overline{MHTRD}$	J111-B2	1: H1 ON
	16	Fixing assembly sub heater (H2) drive command	$\overline{SHTRD}$	J111-B2	1: H2 ON (115 V only)
P004 (input)	1	Cassette size read signal 0	—	J108-11	—
	2	Cassette size read signal 1	—	J108-12	—
	3	Cassette size read signal 2	—	J108-13	—
	4	Cassette size read signal 3	—	J108-14	—
	5	Not used.	—	—	—
	6	Not used.	—	—	—
	7	Not used.	—	—	—
	8	Not used.	—	—	—
	9	KEY read signal 0	—	J114-A12	—
	10	KEY read signal 1	—	J114-B12	—
	11	KEY read signal 2	—	J114-A11	—
	12	KEY read signal 3	—	J114-B11	—
	13	KEY read signal 4	—	J114-A10	—
	14	KEY read signal 5	—	J114-B10	—
	15	KEY read signal 6	—	J114-A9	—
	16	KEY read signal 7	—	J114-A16	—

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Address	bit	Description	Signal	Jack No.	Remarks
P005 (output)	1	LED ON command 0	—	J114-B5 J110-B12	—
	2	LED ON command 1	—	J114-A4 J110-B5	—
	3	LED ON command 2	—	J114-B4 J110-B7	—
	4	LED ON command 3	—	J114-A3 J110-B8	—
	5	LED ON command 4	—	J114-B3 J110-B6	—
	6	LED ON command 5	—	J114-A2 J110-B3	—
	7	LED ON command 6	—	J114-B2 J110-B2	—
	8	LED ON command 7	—	J114-A1 J110-B4	—
	9	Oscillation command 0	digital 0	J114-A8 J108-9	—
	10	Oscillation command 1	digital 1	J114-B8 J108-10	—
	11	Oscillation command 2	digital 2	J114-A7	—
	12	Oscillation command 3	digital 3	J114-B7	—
	13	Oscillation command 4	digital 4	J114-A6	—
	14	Oscillation command 5	digital 5	J114-B6	—
	15	Oscillation command 6	digital 6	J110-B1	—
	16	Not used.	—	—	—
P006 (output)	1	Pilot lamp ON command	—	J114-B1	1:ON
	2	LCD lamp ON command	—	J113-1	1:ON
	3	Not used.	—	—	—
	4	Primary corona wire cleaning control 1 command	PCC1	J115-A17	—
	5	Primary corona wire cleaning control 2 command	PCC2	J115-B2	—
	6	Transfer/Separation corona wire cleaning control 1 command	TCC1	J115-A18	—
	7	Transfer/Separation corona wire cleaning control 2 command	TCC2	J115-B18	—
	8	Developing assembly clutch (CL9) drive command	$\overline{\text{DVD}}$	J106-B8	1: CL9 ON
	9	Main motor (M1) drive command	$\overline{\text{MMD}}$	J101-B4	1: M1 ON
	10	Scanner motor (M2) drive command	$\overline{\text{SCMD}}$	J101-B9	1: M2 ON
	11	Scanner forward command	$\overline{\text{SCFW}}$	J101-B8	1: Forward
	12	Reproduction ratio selection command 0	SCRC0	J101-B16	—
	13	Reproduction ratio selection command 1	SCRC1	J101-B17	—
	14	Reproduction ratio selection command 2	SCRC2	J101-B18	—
	15	Scanner speed control command	SCSC	J101-B12	—

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Address	bit	Description	Signal	Jack No.	Remarks
	16	Scanner stop command	SCST	J101-A18	0: Stop.
P007 (input)	1	Toner color signal 0	CDMS0	J102-A2	—
	2	Toner color signal 1	CDMS1	J102-A3	—
	3	Toner color signal 2	CDMS2	J102-A4	—
	4	Color toner empty signal	$\overline{\text{CTEP}}$	J102-A1	0: Toner absent.
	5	Hopper unit black toner empty signal	$\overline{\text{BTEP}}$	J102-A6	0: Toner absent.
	6	Black toner supply signal	$\overline{\text{BTSP}}$	J111-B9	0: Toner absent.
	7	Main motor abnormal signal	$\overline{\text{MOL}}$	J101-B2	0: Abnormal.
	8	Scanner motor abnormal signal	$\overline{\text{SMOL}}$	J101-B6	0: Abnormal.
	9	Power switch ON/OFF detection signal	$\overline{\text{MSOF}}$	J102-A7	0: OFF
	10	Scanner home position (Q14) signal	SCHP	J101-A12	1: Scanner home.
	11	Control card connect signal	$\overline{\text{CCNTD}}$	J111-A8	0: Card present.
	12	Not used.	—	—	—
	13	Upper lifter position sensor (Q23) signal	$\overline{\text{ULFTP}}$	J109-B4	0: Lifter up.
	14	Lower lifter position sensor (Q25) signal	$\overline{\text{LLFTP}}$	J109-A4	0: Lifter down.
	15	Door switch ON/OFF detection signal	$\overline{\text{DSOF}}$	J102-A10	0: OFF
	16	Not used.	—	—	—
P008 (output)	1	No. 1 registration roller clutch (CL1) drive command	$\overline{\text{RGCD 1}}$	J101-B11	1: CL1 ON
	2	No. 2 feeder unit roller drive solenoid (SL6) drive command	$\overline{\text{DFCD}}$	J106-B6	1: SL6 ON
	3	No. 1 paper deflector drive solenoid (SL11) drive command	$\overline{\text{DPSD1}}$	J106-A3	1: SL11 ON
	4	No. 2 paper deflector drive solenoid (SL12) drive command	$\overline{\text{DPSD2}}$	J106-A2	1: SL12 ON
	5	Not used.	—	—	—
	6	Not used.	—	—	—
	7	Counter drive command	$\overline{\text{TCNTD}}$ $\overline{\text{CCNTD}}$	J110-A7 J111-A6	1: Counter ON
	8	Small counter drive command	$\overline{\text{SCNTD}}$	J110-A6	1: Counter ON
	9	Black developing assembly release solenoid (SL4) drive command	$\overline{\text{BDRSD}}$	J102-B11	1: SL4 ON
	10	Hopper motor (M8) drive command	$\overline{\text{HMD}}$	J111-B1	1: M8 ON
	11	CD unit pressure solenoid (SL3) drive command	$\overline{\text{CDPSD}}$	J102-B10	1: SL3 ON
	12	Color toner supply solenoid (SL2) drive command	$\overline{\text{CTSSD}}$	J102-B9	1: SL2 ON
	13	CD unit connect command	—	J111-B10	—
	14	CD unit lamp ON command	—	J102-A5	1: Lamp ON
	15	—	—	—	—
	16	—	—	—	—

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Address	bit	Description	Signal	Jack No.	Remarks
	1	—	—	—	—
	2	—	—	—	—
	3	—	—	—	—
	4	Scanner cooling fan (FM1) low speed rotation drive command	IFMD	J111-B5	1: Low speed
	5	Scanner cooling fan (FM1) high speed rotation drive command			1: High speed
P009	6	Fan (FN2, 3) low speed rotation drive command	FFMD EFMD	J106-B5 J102-A8	1: Low speed
	7	Fan (FM2, 3) high speed rotation drive command			1: High speed
(output)	8	Lamp regulator drive command	$\overline{\text{LRD}}$	J111-A3	1: Driven.
	9	Not used.	—	—	—
	10	Not used.	—	—	—
	11	Not used.	—	—	—
	12	Not used.	—	—	—
	13	Not used.	—	—	—
	14	Not used.	—	—	—
	15	Not used.	—	—	—
	16	Not used.	—	—	—

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Bit	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
P010	7	6	5	4	3	2	1	0					Upper cassette holder SW701	SW702	SW703	SW704
P011	COPY START	RESET	C/▽	*	#	AE	9	8					Lower cassette holder SW701	SW702	SW703	SW704
P012	CAS-SETTE SELEC-TION	REDUC-TION	ENLARGE-MENT	COLOR SELEC-TION	PAGE SEPARA-TION	TWO-SIDED	OVERLAY	DIRECT					Paper deck B4.....010 LTR.....101 A4.....001 B5.....000			Connect
P013	ZOOM +	ZOOM –	DARK	LIGHT	↓	↑	AUTO RE-PRODUC-TION RATIO	M4	SW901		CLEAN-ING BELT Q29	CLEAN-ING BELT Q28		DIPSW 101-3	DIPSW 101-2	DIPSW 101-1
P014	SORT	FOLD	SHEET FRAME ERASING	ID	GUIDE	M1	AREA	PHOTO					No. 2 paper pick-up unit connect			
P015	RECALL	BINDING MARGIN	FRAME ERASING			WAIT	M2	M3	For factory adjustment							
P016									For factory adjustment							

a. A press on the key or a switch will indicate '1'.
b. A press on the COPY START key starts copy operation.
c. A press on the ↑ and ↓ keys changes the screen.
d. A press on the RESET key clears the service mode.

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Address	bit	Description	Signal	Jack No.	Remarks
P017 (output)	1	Lens drive motor drive command	LMDP1	J112-A8	—
	2	Lens drive motor drive command	LMDP2	J112-A4	—
	3	Belt cleaning motor drive command	WMDP1	J110-A13	—
	4	Belt cleaning motor drive command	WMDP2	J110-A15	—
	5	Lens drive motor drive command	$\overline{\text{LMDP1}}$	J112-A7	—
	6	Lens drive motor drive command	$\overline{\text{LMDP2}}$	J112-A6	—
	7	Belt cleaning motor drive command	$\overline{\text{WMDP1}}$	J110-A14	—
	8	Belt cleaning motor drive command	$\overline{\text{WMDP2}}$	J110-A16	—
P018 (output)	1	Blank exposure lamp ON command	—	J115-A16	—
	2	Blank exposure lamp ON command	—	J115-B17	—
	3	Blank exposure lamp ON command	—	J115-A2	—
	4	Blank exposure lamp ON command	—	J115-A1	—
	5	Blank exposure lamp ON command	—	J115-B1	—
	6	Blank exposure lamp ON command	—	J115-A3	—
	7	—	—	—	—
	8	—	—	—	—
P019 (output)	1	Tray drive motor drive command	TMDP1	J105-B9	—
	2	Tray drive motor drive command	TMDP2	J105-B11	—
	3	Lens motor strobe command	LMSTB	J112-A5	—
	4	—	—	—	—
	5	Motor speed control signal	MMSC	J101-B3	—
	6	Tray drive motor drive command	$\overline{\text{TMDP1}}$	J105-B10	—
	7	Tray drive motor drive command	$\overline{\text{TMDP2}}$	J105-B12	—
	8	Not used.	—	—	—
P020 (input)	1	—	—	—	—
	2	—	—	—	—
	3	—	—	—	—
	4	—	—	—	—
	5	—	—	—	—
	6	Copyboard cover open/closed sensor (MS3) signal	CBCC	J102-B1	0: when the cover is closed.
	7	Lens home position sensor (Q11) signal	LHP	J112-A2	1: Lens present.
	8	Lens home position sensor (Q20) signal	THP	J105-B6	1: Tray present.

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Address	bit	Description	Signal	Jack No.	Remarks
P021		Document size sensor 0 signal	DSZ0	J114-B4	000 ~ 256
P022		Document size sensor 1 signal	DSZ1	J112-B5	—
P023		Document size sensor 2 signal	DSZ2	J112-B6	—
P024		Drum surface potential signal	POT	J110-A11	—
P025		Fixing assembly thermistor signal	TH1	J110-A3	—
P026 (output)	1	Blank exposure lamp ON signal 0	—	J115-A4	—
	2	Blank exposure lamp ON signal 1	—	J115-B4	—
	3	Blank exposure lamp ON signal 2	—	J115-A5	—
	4	Blank exposure lamp ON signal 3	—	J115-B5	—
	5	Blank exposure lamp ON signal 4	—	J115-A6	—
	6	Blank exposure lamp ON signal 5	—	J115-B6	—
	7	Blank exposure lamp ON signal 6	—	J115-A7	—
	8	Blank exposure lamp ON signal 7	—	J115-B7	—
P027 (output)	1	Blank exposure lamp ON signal 8	—	J115-A8	—
	2	Blank exposure lamp ON signal 9	—	J115-B8	—
	3	Blank exposure lamp ON signal 10	—	J115-A9	—
	4	Blank exposure lamp ON signal 11	—	J115-B9	—
	5	Blank exposure lamp ON signal 12	—	J115-A10	—
	6	Blank exposure lamp ON signal 13	—	J115-B10	—
	7	Blank exposure lamp ON signal 14	—	J115-A11	—
	8	Blank exposure lamp ON signal 15	—	J115-B11	—
P028 (output)	1	Blank exposure lamp ON signal 16	—	J115-A12	—
	2	Blank exposure lamp ON signal 17	—	J115-B12	—
	3	Blank exposure lamp ON signal 18	—	J115-A13	—
	4	Blank exposure lamp ON signal 19	—	J115-B13	—
	5	Blank exposure lamp ON signal 20	—	J115-A14	—
	6	Blank exposure lamp ON signal 21	—	J115-B14	—
	7	Blank exposure lamp ON signal 22	—	J115-A15	—
	8	Blank exposure lamp ON signal 23	—	J115-B15	—

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RDF-II

Address	bit	Description	Signal	Pin	Remarks
P029 (input)	1	Registration unit paper sensor (S7) signal	PDP3	J3-4	0: Paper present.
	2	Skew feed sensor (S8) signal	PDP4	J3-6	0: Paper present.
	3	Document alignment solenoid (SL4) drive signal	DSSLD	J11-7	0: SL4 ON
	4	Paper deflector solenoid (SL3) drive signal	FLSLD	J8-1	0: SL3 ON
	5	LED1 ON signal	—	—	0: LED 1 ON.
	6	LED2 ON signal	—	—	0: LED2 ON.
	7	LED3 ON signal	—	—	1: LED3 ON.
	8	Document set indication (LED 101, LED 102) ON signal	OSD	J11-3	1: LED ON.
P030 (output)	1	Pick-up motor (M1) drive signal	PUMD	J4-1	1: Motor ON.
	2	Feeder motor (M2) drive signal	FMD	J5-1	1: Motor ON.
	3	Break (BK) drive signal	BKD	J6-1	0: Break ON.
	4	Belt motor rotation direction (counter-clockwise) signal	BMCCW	J7-1	—
	5	Belt motor rotation direction (clock-wise) signal	BMCW	J7-2	—
	6	Stack separation arm motor (M4) drive signal	RSMP	J11-4	0: Motor ON.
	7	Stack pressure plate solenoid (SL2) drive signal	WGTSLD	J8-4	0: SL2 ON.
	8	Paper stopper plate solenoid (SL1)	STPSLD	J8-1	0: SL1 ON.
P031 (input)	1	For communication with external equipment.	TXD	J13-7	—
	2	For communication with external equipment.	RXD	J13-5	—
	3	For microprocessor.	—	—	—
	4	Feeder motor clock sensor (S5) signal	FMCLK	J10-8	—
	5	Not used.	—	—	—
	6	Belt motor clock sensor (S4) signal	BMCLK	J10-5	—
	7	For communication with external equipment.	REQ	J16-1	—
	8	For communication with external equipment.	ACK	J16-3	—

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RDF-II

Address	bit	Description	Signal	Pin	Remarks
P032 (input)	1	Stack separation arm position sensor (S11) signal	LDD	J11-6	1: Paper present
	2	Pick-up roller home position sensor (S3) signal	PUSP	J10-2	1: Pick-up roller at home position.
	3	Pick-up unit paper sensor (S1) signal	PDP1	J3-2	1: Paper present.
	4	Delivery unit paper sensor (S2) signal	PDP2	J3-4	1: Paper present.
	5	Upper cover switch (MS4, MS5) signal	UPCC2	J18-1	0: When upper cover is closed.
			UPCC1	J2-3	
	6	RDF switch (MS3) signal	RFC	J2-1	0: When RDF is closed.
	7	Push-switch signal	—	—	0: Push-switch ON.
	8	For microprocessor.	—	—	—
P033 (input)	1	DIP switch setting	—	—	—
	2	DIP switch setting	—	—	—
	3	DIP switch setting	—	—	—
	4	DIP switch setting	—	—	—
	5	DIP switch setting	—	—	—
	6	For communication with external equipment.	—	J15-3	0: Connected.
	7	For microprocessor.	—	—	—
	8	Not used.	—	—	—
P050		For set position of VR6.	—	—	—
P051		For set position of VR7.	—	—	—
P052		For set position of VR8.	—	—	—
P053		For set position of VR5.	—	—	—
P054		For set position of VR3.	—	—	—
P055		For set position of VR2.	—	—	—
P056		For set position of VR4.	—	—	—
P057		For set position of VR1.	—	—	—

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D-ADF

Address	bit	Description	Signal	Pin	Remarks
P029 (input)	1	Cover open/closed switch (MS2)/ D-ADF open/closed switch (MS3) signal	DFC	J3-1	1: Cover or D-ADF open.
	2	Cover open/closed switch (MS2) signal	UPCC	J2-1	1: Cover open.
	3	Tray open/closed switch (MS1) signal	TRC	J11-4	1: Tray open.
	4	Push-switch (SW2) sigal	—	—	0: SW2 ON
	5	Pick-up motor clock sensor (S3) signal	PFCLK	J8-4	Alternates between '1' and '0' while pick-up motor rotates.
	6	Pick-up sensor (S5) sigal	PDP1	J9-2	1: Paper present.
	7	Delivery sensor (S1) signal	PDP2	J10-2	1: Paper present.
	8	IPC error signal	CTS1*	—	Resets IPC when '0'.
P030 (output)	1	Document set LED ON signal	DSD	J8-2	1: LED ON
	2	Pick-up motor (M2) drive signal	PUMD	J13-1	1: M2 ON
	3	Delivery motor (M3) drive signal	DMD	J14-1	1: M3 ON
	4	Belt motor (M1) counterclockwise rotation signal	BMCCW	—	0: M1 counterclockwise rotation
	5	Belt motor (M1) clockwise rotation signal	BMCW	—	0: M1 clockwise rotation
	6	Belt break (BK) drive signal	BKD	J12-1	1: BK ON
	7	Paper hold plate solenoid (SL1) drive signal	WGTSLD	J11-2	0: SL1 ON
	8	Stopper plate solenoid (SL2) drive signal	STPSLD	J12-1	1: SL2 ON
P031 (input)	1	LED1 ON signal	—	—	0: LED1 ON
	2	LED2 ON signal	—	—	0: LED2 ON
	3	LED3 ON signal	—	—	0: LED3 ON
	4	Delivery motor clock sensor (S2) signal	DMCLK	J10-5	Alternates between '1' and '0' while delivery motor rotates.
	5	For factory adjustment.	—	—	—
	6	For factory adjustment.	—	—	—
	7	Editor connect signal	ECNT	J6-3	0: Editor present.
	8	Not used.	—	—	—
P032		Address/Data bus	—	—	—
P033		Address bus	—	—	—

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Address	bit	Description	Signal	Pin	Remarks
P050		For set position of VR1.	—	—	—
P051		For set position of SW1.	—	—	—
P052		For set position of SW1.	—	—	—
P053		For set position of SW1.	—	—	—
P054		For factory adjustment.	—	—	—
P055		Not used.	—	—	—
P056		For set position of VR3.	—	—	—
P057		For set position of VR2.	—	—	—

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RDF-III

Address	bit	Description	Signal	Pin	Remarks
P029 (input)	1	For microprocessor	—	—	
	2	Skew feed sensor (S8) signal	PDP4	J3-6	0: Paper present.
	3	Document alignment solenoid (SL4) drive signal	DSSLD	J11-7	0: SL4 ON
	4	Paper deflector solenoid (SL3) drive signal	FLSLD	J8-1	0: SL3 ON
	5	Registration clutch (CL2) drive signal	CLD2	J14-2	0: CL2 ON
		LED1 ON signal	—	—	0: LED1 ON.
	6	Feeding cync clutch (CL1) drive signal	CLD1	J8-5	0: CL1 ON
		LED2 ON signal	—	—	0: LED2 ON.
	7	LED3 ON signal	—	—	1: LED3 ON.
	8	Document set indication (LED 101, LED 102) ON signal	OSD	J11-3	1: LED ON.
P030 (output)	1	Plck-up motor (M1) drive signal	PUMD	J4-1	1: Motor ON.
	2	Feeder motor (M2) drive signal	FMD	J5-1	1: Motor ON.
	3	Break (BK) drive signal	BKD	J6-1	0: Break ON.
	4	Belt motor rotation direction (counter-clockwise) signal	BMCCW	J7-1	—
	5	Belt motor rotation direction (clockwise) signal	BMCW	J7-2	—
	6	Stack separation arm motor (M4) drive signal	RSMP	J11-4	0: Motor ON.
	7	Stack pressure plate solenoid (SL2) drive signal	WGTSLD	J8-4	0: SL2 ON.
	8	Paper stopper plate solenoid (SL1)	STPSLD	J8-1	0: SL1 ON.
P031 (input)	1	DF shutter solenoid (SL5) drive signal	$\overline{\text{STPSLD2}}$	J21-4	1: Motor ON.
	2	DF document sensor (S13) signal	DDEP	J20-4	0: Document present
	3	For microprocessor.	—	—	—
	4	Feeder motor clock sensor (S5) signal	FMCLK	J10-8	—
	5	Belt motor/pick-up motor input clock switching signal	—	—	—
	6	Belt motor clock sensor (S4) signal	BMCLK	J10-5	—
		Pick-up motor clock sensor (S14) signal	PMCLK	J22-2	
	7	DF delivery sensor (S12) signal	PDD6	J20-2	1: Document present
	8	DF DOCUMENT SET indicator (LED301, 302) ON signal	DSD2	J21-2	1: LED ON

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RDF-III

Address	bit	Description	Signal	Pin	Remarks
P032 (input)	1	Stack separation arm position sensor (S11) signal	LDD	J11-6	1: Paper present
	2	Pick-up roller home position sensor (S3) signal	PUSP	J10-2	1: Pick-up roller at home position
		Registration sensor (S7) signal	$\overline{\text{PDP3}}$	J3-4	0: Paper present
	3	Pick-up unit paper sensor (S1) signal	PDP1	J3-2	1: Paper present.
	4	Delivery unit paper sensor (S2) signal	PDP2	J3-4	1: Paper present.
	5	Top cover switch (MS4) signal	UPCC2	J18-1	0: When top cover is closed.
	6	RDF switch (MS3) signal	RFC	J2-1	0: When RDF is closed.
		Top cover switch (MS4) signal	UPCC1	J2-3	0: When top cover is closed.
	7	Push-switch signal	—	—	0: Push-switch ON.
	8	For microprocessor.	—	—	—
P033 (input)	1	DIP switch setting	—	—	—
	2	DIP switch setting	—	—	—
	3	DIP switch setting	—	—	—
	4	DIP switch setting	—	—	—
	5	DIP switch setting	—	—	—
	6	Not used	—		
	7	For communication with external equipment.	—	J16-5	0: connected
	8	DIP switch setting	—	—	
P050		For set position of VR6 and VR9	—	—	—
P051		For set position of VR101	DZ2	J11-10	—
P052		For set position of VR8.	—	—	—
P053		Document edge sensor (S10) signal	DEP	J11-12	
P054		For set position of VR3.	—	—	—
P055		For set position of VR2.	—	—	—
P056		For set position of VR4.	—	—	—
P057		For set position of VR1.	—	—	—

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Sorter VII

Address	bit	Description	Signal name	Jack No.	Remarks
P034 (input)	1	Lead cam home position sensor (PL1) signal	LCHP	J25-2	1: Lead cam is at home position.
	2	Bin home position sensor (P12) signal	BHP1	J25-5	1: Bin is at home position.
	3	Bin non-sort position sensor (P13) signal	BHP2	J25-8	1: Bin is at non-sort position.
	4	Paper sensor 1 (P14) signal	PDP1	J26-2	0: Paper present.
	5	Paper sensor 2 (P15) signal	PDP2	J26-5	0: Paper present.
	6	Feed door (MS3) signal	RDC	J26-7	0: When feed door is closed and sorter is connected.
	7	DIP switch setting	—	—	—
	8	DIP switch setting	—	—	—
P035 (output)	1	Bin motor (M1) ON command	BMON	J21-5	1: M1 ON
	2	Bin motor (M1) down command	BMDWW	J21-6	1: Bin Lowers.
	3	Deflection plate solenoid (SL1) drive signal	PDSD	J27-3	1: SL1 ON
	4	LED1 drive signal	—	—	0: LED1 ON
	5	Not used.	—	—	—
	6	Not used.	—	—	—
	7	SW1	—	—	0: SW1 ON
	8	SW2	—	—	0: SW2 ON
P036 (output)	1	For microprocessor.	—	—	—
	2	For microprocessor.	—	—	—
	3	Not used.	—	—	—
	4	Not used.	—	—	—
	5	Not used.	—	—	—
	6	Not used.	—	—	—
	7	Feed roller motor (M2) drive signal	PEMD	J27-1	1: M2 ON
	8	Not used.	—	—	—

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Sorter VIII

Address	bit	Description	Signal	Pin	Remarks
P034 (input)	1	Lead cam home position (PI1) signal	LCHP	J4-2	1: Lead cam at home position.
	2	Bin non-sort position (PI2) signal	BNSP	J4-5	1: Bin at non-sort position.
	3	Push-switch (SW2)	—	—	0: SW2 ON
	4	Push-switch (SW3)	—	—	0: SW3 ON
	5	DIP switch (SW1-1)	—	—	0: SW1-1 ON
	6	DIP switch (SW1-2)	—	—	0: SW1-2 ON
	7	In-position switch (MS1)	SIP	J4-7	0: MS1 ON
	8	Paper detection (P13) signal	PDP	J5-2	0: Paper present.
P035 (output)	1	Bin motor down signal	BMDWN	—	1: Bin down.
	2	Bin motor up signal	BMUP	—	1: Bin up.
	3	Paper deflector solenoid (SL1) drive signal	PDSD	J6-2	1: SL1 ON
	4	Not used.	—	—	—
	5	LED1 ON signal	—	—	0: LED1 ON
	6	Not used.	—	—	—
	7	Not used.	—	—	—
	8	Not used.	—	—	—
P036 (output)	1	For factory adjustment.	—	J2-7	—
	2			J2-5	
	3			J2-3	
	4			J2-1	
	5	Not used.	—	—	—
	6	Not used.	—	—	—
	7	Feed motor (M2) drive signal	PFMD	J5-4	1: M2 ON
	8	Communication error signal	—	—	—

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Staple Sorter

Address	bit	Description	Signal	Pin	Remarks
P034 (input)	1	Stapler unit set signal	SPUSET	J11-1	0: Stapler unit connected.
	2	Stapling home position sensor (MS8) signal	SPLHP	J11-3	1: At home position.
	3	Stapler unit swing sensor (MS9) signal	SWGSET	J8-5	0: At stapling position or home position.
	4	Stapler cover open/closed sensor (MS5) signal	SPLOPN	J10-3	1: Cover open.
	5	Staple guide bar home position sensor (PI7) signal	SGBHP	J12-6	1: At home position.
	6	Lead cam home position sensor (PI2) signal	LCHP	J14-5	1: At home position.
	7	Bin shift motor (M2) up signal	BMUP	—	0: M2 up rotation.
	8	Bin shift motor (M2) down signal	BMDOWN	—	0: M2 down rotation.
P035 (output)	1	Staple guide bar swing motor (M3) drive pulse A	PMA	J13-3 J13-5	Alternates between '1' and '0' while M3 rotates.
	2	Staple guide bar swing motor (M3) drive pulse B	PMB	J13-4 J13-6	
	3	Staple guide bar swing motor (M3) drive power supply	PMON	J13-1 J13-2	0: Drive power supply ON.
	4	Staple motor (M4) normal rotation signal	SPLMFW	—	0: M4 rotates in normal direction.
	5	Staple motor (M4) reverse rotation signal	SPLMRV	—	0: M4 rotates in reverse direction.
	6	Switch-back path solenoid (SL1) drive signal	SBPSLD	J7-10	0: SL1 ON
	7	Paper path switch solenoid (SL2) drive signal	PSLD	J7-8	0: SL2 ON
	8	Paper hold solenoid (SL3) drive signal	PHSLD	J5-2	0: SL3 ON

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Staple Sorter

Address	bit	Description	Signal	Pin	Remarks
P036 (output)	1	Not used.	—	—	—
	2	Staple ready indicator ON signal	SPLOK	J8-4	0: ON
	3	Bin paper sensor LED ON signal	LON	J12-2	1: ON
	4	Not used.	—	—	—
	5	Stapler unit swing motor (M5) drive signal	SWGMD	J9-1	1: M5 ON
	6	Feeder motor clock sensor (PI6) signal	FMCLK	J5-4	Alternates between '1' and '0'.
	7	Feeder motor (M1) drive signal	FMD	J6-1	1: M1 ON
	8	Feeder motor (M1) brake signal	FMBK	J6-2	1: M1 braked.
P037 (input)	1	Stapling position paper sensor (PI8) signal	SPD	J8-8	1: Paper present.
	2	—	—	—	—
	3	Manual staple key signal	MNSPL	J8-1	0: Key ON.
	4	Non-sort path paper sensor (PI4) signal	NSPEXT	J7-5	0: Paper present.
	5	Sort path paper sensor (PI5) signal	SPEXT	J7-2	0: Paper present.
	6	Bin unit home position sensor (PI3) signal	BHP	J14-2	1: At home position.
	7	Joint sensor (MS1) signal	SOP	J2-2	0: MS1 ON
	8	Stapling position set sensor (MS6) signal	SPLSET	J10-6	1: At stapling position.

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Stapler sorter A1/sorter B1

Address	bit	Display	Signal/ Command	Jack No.	Remarks
P034 (input)	1	Reserved.	—	—	
	2	Stapling home position (PI12) signal	SPL-HP	J11-3	1: Stapling is at home position.
	3	Stapler unit swing sensor (MS9) signal	SWG SET	J8-5	1: Stapler is at home position or stapling position.
	4	Stapler cover open/closed sensor (MS5) signal	SPLOPN	J10-3	1: Stapler cover is open.
	5	Guide bar home position sensor (P17)	SGBHP	J12-6	1: Bar is at home position.
	6	Lead cam home position sensor (P15) signal	LCHP	J14-5	1: Cam is at home position.
	7	Reserved.	—	—	
	8	Reserved.	—	—	
P035 (output)	1	Guide cover swing motor (M3) phase A excitation signal	$\overline{MA}$	J13-3, 5	
	2	Guide cover swing motor (M3) phase B excitation signal	$\overline{MB}$	JB-4, 6	Alternates between '1' and '0' while motor is ON.
	3	Guide bar switn motor (M3) drive command.	MON	J13-2	1: Motor goes ON.
	4	Staple motor (M4) CW rotation command	$\overline{SPLMFW}$	—	0: Motor rotates clockwise
	5	Staple motor (M4) CW Rotation command	$\overline{SPLMRV}$	—	0: Motor rotates CCW
	6	Switch-back path solenoid (SL1) drive command	$\overline{SBPSLD}$	J7-10	0: SL1 goes ON.
	7	Paper path switch solenoid (SL2) drive command	$\overline{PSLD}$	J7-8	0: SL2 ON.
	8	Paper path switch solenoid (SL3) drive commmand	$\overline{PHSLD}$	J5-2	0: SL3 ON.
P036 (output)	1	Motor switch signal	—	—	
	2	Stapling ready display ON signal	SPLOK	J8-4	1: LED ON.
	3	Bin inside paper sensor LED ON signal	$\overline{BPD}$	J12-2	
	4	Motor clock signal	—	—	
	5	Stapler unit swing motor (M5) drive command	$\overline{SWGMD}$	J9-1	1: M5 ON
	6	Feed motor clock sensor (P16) signal	FMCLK	J5-4	
	7	Reserved	—	—	
	8	Feed motor (M1) brake signal	—	—	1: M1 goes OFF.

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Stapler sorter A1/sorter B1

Address	bit	Display	Signal/ Command	Jack No.	Remarks
P037 (input)	1	Stapling position paper sensor signal	SPD	J8-8	1: Paper is present.
	2	Reserved.	—	—	
	3	Manual staple key signal	MNSPL	J8-1	0: Switch is ON.
	4	Non-sort paper sensor signal	$\overline{\text{NSPEXT}}$	J7-5	0: Paper is present.
	5	Sort paper sensor signal	$\overline{\text{SPEXT}}$	J7-2	0: Paper is present.
	6	Bin unit home position sensor signal	BHP	J14-2	1: Bin unit is at home position.
	7	Joint sensor signal	$\overline{\text{SOP}}$	J2-2	0: Sorter is released.
	8	Reset signal	—	—	

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Auto Stapler Folder/Auto Stapler II/III

Address	bit	Description	Signal	Pin	Remarks
P038	0	Staple guide plate drive motor (M7) drive pulse	PMA	J7-11	Alternately '1' and '0' while M7 is rotationg.
	1		$\overline{\text{PMA}}$	J7-12	
	2		PMB	J7-13	
	3		$\overline{\text{PMB}}$	J7-14	
	4	Staple guide plate drive motor (M7) drive power	PMON	J7-9	1: Drive power ON.
	5	No.2 paper path drive solenoid (SL3) drive signal	$\overline{\text{P2SLD}}$	J4-2	0: SL3 ON.
	6	Paper deflector 1 solenoid (SL1) drive signal	$\overline{\text{D1SLD}}$	J4-4	0: SL1 ON.
	7	Paper deflector 2 solenoid (SL2) drive signal	$\overline{\text{D2SLD}}$	J4-6	0: SL2 ON.
P039	0	Feed motor (M1) drive signal	FMD	J7-3	1: M1 rotates.
	1	No.1 delivery motor (M4) drive signal	DM1D	J7-1	1: M4 rotates.
	2	No.2 delivery motor (M2) normal rotation signal	$\overline{\text{DM2FW}}$	—	1: M2 rotates in normal direction
	3	No.2 delivery motor (M2) reverse rotation signal	$\overline{\text{DM2RW}}$	—	1: M2 rotates in reverse direction.
	4	Staple motor (M6) normal rotation signal	$\overline{\text{SPLMFW}}$	—	0: M6 rotates in normal.
	5	Staple motor (M6) reverse rotation signal	$\overline{\text{SPLMRV}}$	—	0: M6 rotates in reverse.
	6	Shift motor (M8) drive signal	SFMD	J5-5	1: M8 rotates.
	7	Swing unit drive motor (M5) drive signal	SWMD	J7-5	1: M5 rotates.
P040	0	No.2 delivery motor clock sensor (PI2) signal	DM2CLK	J9-B13	Alternately '1' and '0' while M2 is rotating.
	1	Stack motor clock sensor (PI10) signal	STMCLK	J6-2	Alternately '1' and '0' while M3 is rotating.
	2	Staple guide plate home position sensor (PI1) signal	SGHP	J19-A13	1: When at home position.
	3	No.1 delivery motor clock sensor (PI6) signal	DMICLK	J9-B7	Alternately '1' and '0' while M1 is rotating.
	4	No.1 paper path sensor (PI9) signal	$\overline{\text{PP1D}}$	J9-A10	0: Paper present.
	5	No.2 paper path sensor (PI8) signal	$\overline{\text{PP2D}}$	J9-B10	0: Paper present.
	6	Swing unit home position sensor (PI7) signal	$\overline{\text{SWHP}}$	J9-A4	0: Swing unit is at topmost or bottom most.
	7	Sub tray solenoid (SL4) drive signal	$\overline{\text{SSLD}}$	J5-4	0: SL4 ON.

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F. Adjustment Mode (☒ 3 ☒)

Select the screen with the ↑ and ↓ keys.

a. Use the input keys to enter the settings, and use the ENLARGEMENT/REDUCTION keys to increase/decrease the settings.
b. Use the ID key to reverse the +/– indications.
c. Use the # key to store the settings.

☒3☒ ADJUST
VR106_L : –130 ◄ 010

Item	Description	Setting range	Remarks
DRUM_SEL	Adjusts the sensitivity to suit the photosensitive drum.	1, 2, 3, 4, 5	Enter the setting written on the sheet packed with the drum when replacing the drum. A press on the # key activates potential control.
VR106_L	Adjusts the scanning lamp reference ON voltage for copying at 50% to 89% reproduction ratio.	–128 ~ +127	The copy density decreases when the setting is increased. A press on the COPY START key automatically changes the main motor speed to high or low to enable copy operation.
VR106_H	Adjusts the scanning lamp reference ON voltage for copying at 90% to 200% reproduction ratio.		
VR103_B	Adjusts the light intensity for newspapers for AE mode and black copies.	000 ~ 255	The density of copies of newspapers increases when the setting is increased. Refer to "Adjustment for AE" in the SERVICE HANDBOOK.
VR103_C	Adjusts the light intensity for newspapers for AE mode and color copies.		
COLOR	Adjusts the scanning lamp reference ON voltage for color copies.	–128 ~ +127	The copy density decreases when the setting is increased.

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Item	Description	Setting range	Remarks
PHOTO_B	Adjusts the developing bias (DC component) for the photo mode.	000 ~ 255	The copy density decreases in the photo mode when the setting is increased.
REGIST_L	Adjusts the registration for copying at 50% to 89% reproduction ratio. (leading edge)	-128 ~ +127	The ON timing for the registration roller is delayed when the setting is increased (the copy paper will be delivered later). A press on the COPY START key automatically changes the main motor speed to high or low to enable copy operation. (unit: 0.1 mm)
REGIST_H	Adjusts the registration for copying at 90% to 200% reproduction ratio. (leading edge)		
LE_BLANK	Adjusts the leading edge margin (ON time for the blank exposure lamp).	000 ~ 255	The margin at the leading edge increases when the setting is increased. (unit: 0.2 mm)
S_BRAKE	Adjusts the brakes for reverse movement of the scanner.	000 ~ 255	The degree of braking on the scanner increases when the setting is increased.
AE_BRAKE	Adjusts the brakes for reverse movement of the scanner for AE measurement.	000 ~ 255	The degree of braking on the scanner increases when the setting is increased.
PRETRANS	Adjusts the current for the pre-transfer corona unit.	000 ~ 255	The current output to the corona unit increases when the setting is increased.
TRANSFER	Adjusts the current for the transfer corona unit.		
SEPARATE	Adjusts the current for the separation corona unit.		
VR107_L	Adjusts the optimum exposure for copying at 50% to 89% reproduction ratio (when not under potential control).	000 ~ 255	The copy density decreases when the setting is increased.
VR107_H	Adjusts the optimum exposure for copying at 90% to 200% reproduction ratio (when not under potential control).		
BOOK_ERA.	Adjusts the width of frame erasing at the center of the document in the book frame erasing mode.	6 ~ 100	The width of the frame erasing increases when the setting is increased. (unit : 1 mm)

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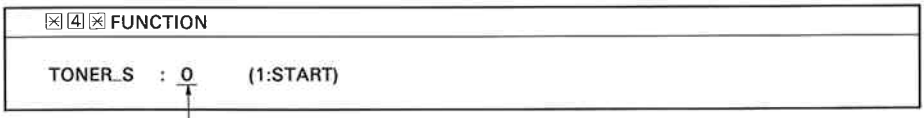
G. Function Mode (☒ 4 ☒)

a. Select the screen with the ↑ and ↓ keys.
b. A press on the CASSETTE SELECTION key starts the operation.
c. Be sure to perform each operation during standby only.



'1' at time of operation.

Item	Description	Remarks
TONER_S	Toner supply for installation	A press on the CASSETTE SELECTION key supplies the toner from the hopper unit to the developing assembly. (3 min max.) After toner is supplied, the operation stops automatically.
AE_ADJST	Automatic adjustment of the density measurement level for the AE mode	Refer to the SERVICE HANDBOOK.
SIZE_ADJ	Automatic adjustment of the document size detection level	Refer to the SERVICE HANDBOOK.
CD_ROT	Idle rotation mode for installation of CD units	A press on the CASSETTE SELECTION key causes the main motor to rotate for 1 min and the developer inside the CD unit is stirred. See P.5-7.
PO.CONT.	Turns the potential control mechanism ON and OFF. 0: Potential control mechanism ON 1: Potential control mechanism OFF	To turn the potential control mechanism OFF, press the CASSETTE SELECTION key so that the indication is '1'.
SIZE_DE.	Turns the document size detection mechanism ON and OFF. 0: Detection mechanism ON 1: Detection mechanism OFF	To turn the document size detection mechanism OFF, press the CASSETTE SELECTION key so that the indication is '1', thus disabling the AE key.
ERROR	Clear mode for E000, E001, E002, E003, or E020.	To clear the error codes, press the CASSETTE SELECTION key so that the indication is '1'.

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Item	Description	Remarks
DISPLAY	Checks if the indications on the control panel are normal.	A press on the CASSETTE SELECTION key causes the LEDs on the control panel to light for 3 sec.
BLANK	Checks if the blank exposure lamp is normal.	A press on the CASSETTE SELECTION key causes the blank exposure lamp to light for 3 sec.
LAMP	Checks if the scanning lamp is normal.	A press on the CASSETTE SELECTION key causes the scanning lamp to light for 3 sec.
H_MOTOR	Checks the operation of the hopper motor.	A press on the CASSETT SELECTION key causes the hopper motor to rotate for 3 sec.
GRID_ADJ	Adjusts the grid voltage of the primary corona unit.	Refer to the SERVICE HANDBOOK.
SEASON	Environment switch	If the image is faulty (double image) because of high temperature and humidity, press the CASSETTE SELECTION key so that the indication is '1'. The press will change the output of the transfer/separation and pre-transfer corona units.
B_BAND	For factory adjustment.	—
B_BIAS	For factory adjustment.	—
RAM_INIT	Clears and initializes the data in the RAMs (Q116, Q117) on the DC controller PCB.	A press on the CASSETTE SELECTION key initializes the data in the RAMs.

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H. User Option Mode (⊠ 5 ⊠)

a. Select the screen with the ↑ and ↓ keys.
b. Press the input keys or the ENLARGEMENT/REDUCTION keys to increase/decrease the settings.
c. A press on the CASSETTE SELECTION key stores the new settings.

⊠5⊠ USER PTION
STD_MODE : 0 (1: SET)

Item	Function	Description	Remarks
STD_ MODE	Sets the standard mode.	The mode to be selected in response to a press on the RESET key can be set freely.	Indicate the standard mode desired on the control panel, select this item, and press the CASSETTE SELECTION key.
AUTO_ CST	Turns the auto cassette change mechanism ON and OFF.	When the cassette selected runs out of copy paper during continuous copy operation, the other cassette holder will be automatically selected if it contains a cassette (paper) of the same size, and the copy operation will be continued. 1: Auto cassette change mechanism OFF 0: Auto cassette change mechanism ON	—
BEEP	Buzzer selection	1: Buzzer not selected 0: Buzzer selected	—
ERASE	Selects standard sheet frame erasing	The frame erasing mechanism, which provides a margin of 2.5 mm on both sides of copy paper, can be turned OFF. 0: With 2.5 mm margin 1: Without 2.5 mm margin	—
BIND	Selects the binding mode.	A margin for binding will be created on the 2nd side for the one-sided document to two-sided copy and two-sided document to one-sided copy modes.	1: With binding margin 0: Without binding margin

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Item	Function	Description	Remarks
SORT	Selects the sort mechanism for single documents.	Single documents can also be sorted when a feeder is in use. 0: Sorting not selected 1: Sorting selected	—
MODE_INI	Initializes the user option mode.	Each item set in the user option mode is cleared.	1: Initialization ON
FEED. AE	Selects the AE mode when a feeder is used.	The number of AE measurement points decreases to speed up the copy operation when a feeder (RDF-II, etc.) is used. The number of points can be changed as follows: 0: Measurement of 8 points 1: Measurement of 23 points If '1', an AE scan is performed for each document; the speed of copy operation, therefore, will slow down appreciably.	—
CD_MULTI	Clears the prohibit items for the manual feed color copy mode.	Copies cannot be made manually with the copyboard cover or feeder open. To clear this, enter '1'.	—
DATE TIME	Turns the date and time indications ON and OFF.	0: Indicates the date and time on the control panel. 1: Does not indicate the date and time on the control panel.	—
DATE_SEL	Selects the manner of date indication.	Dates can be indicated either of the following ways; for Aug.27, 0: 8/27 1: 27/8 2: AUG/27	At time of shipment from the factory, the indication is '8/27', i.e., '0'. To change it, press the '1' or '2' key; thereafter, the # key.
SHUT-OFF	Sets the auto shut-off time.	The auto shut-off time can be set between 10 to 300 min in 10-min increment. If set to 0 min, the mechanism is disabled.	Enter the setting with the input keys, and press the # key.
US CAS. 0 (1: SET)	Registers the US cassette sizes.	Register the size of the paper to be set in the universal cassette. The registration enables auto reproduction ratio selection and two-sided/overlay copying. 0: Not registered 1: Registered	Length: paper-feed Width: cross-feed 1) Press the CASSETTE SELECTION key to indicate '1'. 2) Press the input keys to enter the value for length. 3) Press the # key. 4) Press the input keys to enter the value for width. 5) Press the # key.
UL CAS. 0 (1: SET)	Registers the UL cassette sizes.		
ALL_AUTO	Selects the document size unit; for mixing mode; i.e., AB or inch.	Auto paper selection may be used when the document mixed size mode is selected (user mode; *2*) with AB/inch documents mixed in the feeder. 0: No mixing of AB/inch. 1: mixing of AB/inch.	—

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I. Counter Mode (☒ 6 ☒)

Select the screen with the ↑ and ↓ keys.
A press on the CLEAR key and '0' key at the same time when the COUNTER screen is shown returns the count to '00000000'.

☒ 6 ☒ COUNTER
TOTAL_CD : 00000001

Item	Description	Max. No. of digits
TOTAL_CD	Total of color copies	Returns to '00000000' after '99999999'.
RED	Count for red copies	
BLUE	Count for blue copies	
TOTAL	Total copy count	
MULTI	Paper pick-up operations for multiple copies	
UPPER	Paper pick-up operations for upper cassette	
LOWER	Paper pick-up operations for lower cassette	
DECK	Paper pick-up operations for paper deck	
TWO-SIDE	Paper pick-up operations for 2nd side in two-sided copy mode	
OVER-LAY	Paper pick-up operations for 2nd side in overlay copy mode	

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VIII. SELF-DIAGNOSIS

The microprocessor on the DC controller PCB is capable of checking the condition of the copier, sensors in particular.

If an abnormal condition is found in the copier, an error code will be indicated on the control panel.

The codes are listed below together with the cause of such abnormal conditions and timing for the checks.

Code	Main cause	Timing
E000	• Thermistor (TH1) has poor contact or broken wire. • Heater (H1, H2) has broken wire. • Thermal fuse has broken wire. • SSR is faulty. • DC controller PCB is faulty.	The temperature of the fixing roller does not reach 100 °C within 180 sec after the power switch is turned ON.
E001	• SSR is faulty. • DC controller PCB is faulty.	The temperature of the fixing assembly upper roller is in excess of 230°C for 5 sec or more.
E002	• Thermistor (TH1) has poor contact or broken wire. • Heater (H1, H2) has broken wire. • Thermal fuse has broken wire. • SSR is faulty. • DC controller PCB is faulty.	The temperature of the fixing assembly upper roller does not reach 180 °C within 5 min after it exceeds 100 °C.
E003		The temperature of the fixing assembly upper roller is 100 °C or less for 5 sec or more after it reached 180 °C.
E005	• When the cleaning belt inside the fixing assembly has been taken up. • Cleaning belt detection sensor (Q28, Q29) is faulty. • DC controller PCB is faulty.	When the length of the cleaning belt inside the fixing assembly is in excess of the value specified.
E010	• Main motor is faulty. • Main motor driver PCB is faulty. • DC controller PCB is faulty.	Clock pulses, 2 pulses or more within 1 sec, are not sent after the main motor drive command is generated.
E020	• Hopper motor is faulty. • Black toner level detection circuit is faulty. • DC controller PCB is faulty. • Hopper toner sensor is faulty.	• The output of the hopper toner is '1' and, moreover, the black toner supply signal is '0' for 5 min or more. • The black toner supply signal does not go '1' 6 min after the black toner supply sequence at time of installation.

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Code	Main cause	Timing
E030	• Counter has broken wire. • DC controller PCB is faulty.	A broken wire is detected for the counter.
E050	Duplexing unit: • Tray home position sensor is faulty. • Tray drive motor is faulty. • DC controller PCB is faulty.	• The tray home position signal (THP) is not generated within 4 sec during which the tray drive motor drive commands (TMDP1, 2) are generated. • The tray home position signal (THP) is generated for 2 sec while the tray drive motor drive signals (TMDP1, 2) are generated.
E203	• Scanner home position sensor is faulty. • DC controller PCB is faulty.	The scanner home position signal (SCHP) is generated two or more pulses within 0.5 sec when the scanner motor is ON.
E2 10	• Lens home position sensor is faulty. • Lens drive motor is faulty. • DC controller PCB is faulty.	• The lens home position signal (LHP) is not generated within 9 sec after the power switch or door switch is turned ON. • The lens home position signal (LHP) is generated for 2 sec or more.
E7 10	• DC controller PCB is faulty.	Q120 on the DC controller PCB cannot be initialized at time of power ON.
E7 11	• DC controller PCB is faulty.	Q120 on the DC controller fails.
E7 12	Feeder: • Feeder controller PCB is faulty. • Connector has poor contact. • 24 V power supply is faulty.	• The communication IC on the feeder controller PCB fails.
No code indication; keys are locked.	• Scanner motor is faulty. • Scanner home position sensor is faulty. • Scanner motor driver PCB is faulty. • DC controller PCB is faulty.	• The scanner home position signal (SCHP) is not generated within 10 sec after the power switch or COPY START key is turned ON.
	• Scanner motor is faulty. • Scanner at document edge sensor is faulty. • Scanner motor driver PCB is faulty. • DC controller is faulty.	• The scanner at document edge signal (SCDP) is not generated within 0.4 sec after the scanner starts to move forward. • The scanner at document edge signal (SCDP) is not generated within 1 sec after the scanner starts to move in reverse.

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Code	RDF-II/RDF-IIn	D-ADF	RDF-III
E401	● A flag is mounted on the shaft of the paper pick-up motor (M1). The flag, by blocking the paper pick-up roller sensor (S3), monitors the rotation of M1. S3 is not turned ON and OFF twice or more within 1 sec.	● A flag is mounted on the shaft of the paper pick-up motor (M1). The flag, by blocking the paper pick-up roller sensor (S3), monitors the rotation of M1. S3 is not turned ON and OFF twice or more within 1 sec.	● S3 fails to go ON and OFF twice or more within 1 sec; a flag is attached to the spindle of the pick-up motor (M1) to check the rotation of M1, with the flag blocking and unblocking the pick-up roller sensor (S3).
E402	● The number of the belt clock pulses within 200 ms is below the specified value.	● The number of the belt clock pulses within 200 ms is below the specified value.	● The belt clock pulses over a period of 200 msec fall short of a specified value.
E403	● The number of the motor clock pulses within 200 ms is below the specified value.	—	● The feeder motor clock pulses over a period of 200 msec fall short of a specified value.
E404	—	● The number of the motor clock pulses within 200 ms is below the specified value.	—
E405	—	—	● The pick-up motor clock pulses over a period of 200 msec fall short of a specified value.
E411	● The output of the sensor is 2.3 V or more in the absence of paper.	● The output of the sensor is 2.3 V or more in the absence of paper.	● The output of the sensors is 2.3 V or more in the absence of paper.
E712	● Communication is interrupted for 200 ms or more; montitoring is continuous.	● Communication is interrupted for 200 ms or more; montitoring is continuous.	● The communication is interrupted for 5 sec or more; at all times.

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Code	Auto Stapler Folder	Stapler Soter AI
E500	● An error occurs in the communication with the copying machine.	● An error occurs in the communication between the sorter and copier.
E510	● No clock signal is input for more than 500 ms while the motor drive signal is output.	● The clock signal from the motor remains OFF for 250 ms or more.
E512	● No clock signal is input for more than 500 ms while the motor drive signal is output.	—
E513	—	● The clock signal from the motor remains OFF for 250 ms or more.
E514	● No clock signal is input for more than 500 ms while the motor drive signal is output.	—
E520	● The upper limit sensor (MS6) fails to go ON within 8 sec after the motor drive signal is output. ● No clock signal is input for more than 500 ms while the motor drive signal is output.	—
E530	● The staple guide plate home position sensor (PI1) fails to go OFF within 4 sec after the motor drive signal is output.	● The home position sensor (PI7) fails to go OFF after 2560 pulses of the motor drive signal have been generated.
E531	● The stapling home position sensor (MS4) fails to go OFF within 300 ms sec after the motor drive signal is output. ● MS4 fails to go ON within 800 ms after the reverse rotation signal is output because of a staple jam.	● The stapler unit swing sensor (MS9) fails to go OFF within 500 ms after the motor drive signal has been generated. ● The sensor fails to go ON within 1000 ms after MS9 has gone OFF.
E535	● The swing unit home position sensor (PI7) fails to go OFF within 300 ms after the motor drive signal is generated. ● PI7 fails to go ON again within 1 sec after it has gone OFF.	—
E540	● The stack tray shift width sensor (MS8) fails to go OFF within 500 ms after the motor drive signal is output. ● MS8 fails to go ON again within 1 sec after it has gone OFF.	● The lead cam home position sensor (PI2) fails to go OFF within 2000 ms after the motor drive signal has been generated. ● The sensor fails to go ON within 200 ms after it has gone OFF.

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Code	Sorter VII	Sorter VIII	Staple Sorter
E500	• An abnormal condition exists in communication between the sorter and copier.	• An abnormal condition exists in communication between the sorter and copier.	• An abnormal condition exists in communication between the sorter and copier.
E5 10	• The motor encoder does not generate pulses within 5 sec after the power is turned ON.		• The clock sensor (PI6) does not generate pluses within 5 sec after the motor drive command is sent.
E530			• The home position sensor (PI7) does not go OFF after 256 pulses of the motor drive command have been generated.
E531			• The stapler unit swing sensor (MS9) does not go OFF within 500 ms after the motor drive command is sent. MS9 does not go ON again within 700 ms after it went OFF.
E540	• The lead cam position detection sensor (PI1) does not go OFF within 0.5 sec after the bin motor drive command (BMON) is generated.	• The lead cam position detection sensor (PI1) does not go OFF within 0.5 sec after the bin motor drive command (BMON) is generated.	• The lead cam home position sensor (PI1) does not go OFF within 500 ms after the motor drive command is sent.
E541	• The lead cam position sensor (PI1) does not go ON within 1.0 sec after the lead cam position sensor went OFF.	• The lead cam position detection sensor (PI1) does not go ON within 1.0 sec after the lead cam position detection sensor went OFF.	

Note:

1. To reset the copier after an error is identified by self-diagnosis, turn it OFF once and ON again.
   In the case of 'E000', 'E001', 'E002', 'E003', or 'E020', however, the copier will not be reset by the above operation. This is to prevent the user from resetting the system particularly in the event the thermistor breaks; otherwise, the fixing roller will be heated and damaged.
   'E000', 'E001', 'E002', 'E003', and 'E020' are stored in the RAM on the DC controller; it is, therefore, necessary to clear the data in the RAM.
   1) Select the service mode.
      ☒ 4 ☒
   2) Press the ↑ or ↓ key to select 'ERROR'.
   3) Press the CASSETTE SELECTION key to clear the error indication.
2. If the error code is in the 400s or E171, the copier runs the self-diagnosis once again when the power switch is turned OFF and ON and indicates 'FEEDER FAILURE.' Copies, however, can still be made using the feeder as the copyboard cover.
3. If the error code is in the 500s (except E500), the copier runs the self-diagnosis once again when the power switch is turned OFF and ON and indicates 'SORTER FAILURE. DETACH SORTER.' Copies, however, can still be made by detaching the sorter from the copier (hold the handle and slide it to the left).

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Self-Diagnosis in Editor

The microprocessor of the editor controller PCB is equipped with a mechanism called self-diagnosis to check its condition. The microprocessor performs self-diagnosis as necessary and, if a problem is identified, it indicates the particulars of the problem by flashing LEDs. The combination of LEDs flashed for the problem and timing for such check are as follows.

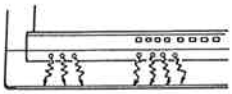
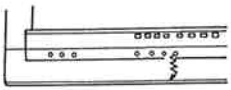
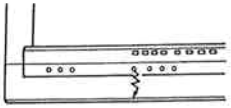
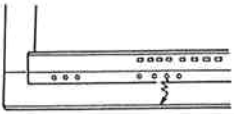
Flashing pattern	Main couse	Check timing
1 	• Broken or disconnected harness • Failure of editor control	• At power-on.
2 	• Broken or disconnected cable between plane-shaped resistor and editor controller	• At power-on.
3 	• Shorted plane-shaped resistor (The coordinates input face of the editor is under pressure in excess of the specified value at time of power-on.)	• At power-on.
4 	• Abnormal data communication.	The communication is monitored at all times; the error is indicated if communication is absent for 200 ms or more.

Table 3-38

The LED(s) flashes at 1-minute intervals (ON and OFF).

If the LEDs flash in pattern 1 or 4, the error can be cleared by turning the copier OFF once.

If they flash in pattern 2 or 3, the error is cleared upon removal of the cause.

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CHAPTER 4

MECHANICAL SYSTEM

1. Disconnect the power cord for safety before disassembly or reassembly work.
2. Group the screws by type (length and diameter) and location.
3. One of the mounting screws used for the rear cover is fitted with a washer to protect against static electricity. Be sure to keep them together for assembly.
4. The mounting screws used for the grounding wire and varistors are fitted with a washer to ensure electrical conductivity. Be sure to use the washer for assembly.
5. If possible, avoid operating the printer with any of its parts removed.
6. Unless otherwise noted, reassembly is the reverse of disassembly.

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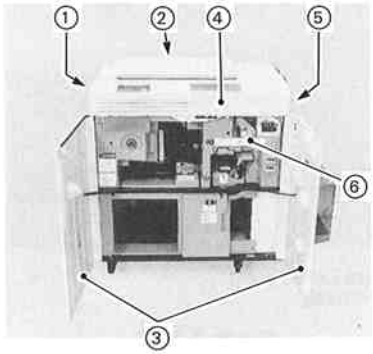
I. EXTERNALS

A. External Covers



① Left panel (6)
② Rear panel (8)
③ Front doors
④ Upper front panel (5)
⑤ Right panel (4)
⑥ Drum cover (2)

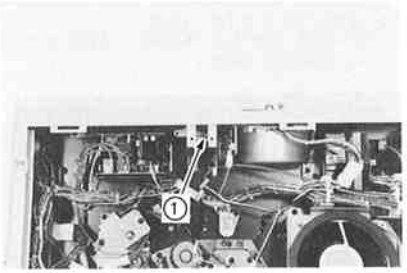
Figure 4-100

Note:
The number in parentheses indicates the number of mounting screws used.

Remove the covers as necessary in cleaning, inspecting, or repairing the inside of the copier as follows:
Covers that can be detached by merely removing the screws are left out of the procedure.

1. Upper Cover

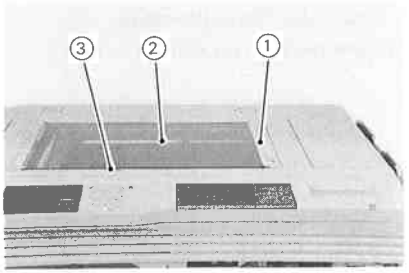
1) Open the front doors, remove the five screws, and remove the upper front panel.
2) Remove the control panel. (See p. 4-3.)
3) Remove the rear panel.
4) Remove the copyboard cover or feeder (D-ADF or RDF) from the copier.
5) Pick the bushes with fingers (left, right) at the bottom, and push them up to remove.



① Bush

Figure 4-101

6) Remove the copyboard glass retainer (2 screws), and remove the copyboard glass.
7) Remove the screw, and remove the magnet plate.



① Copyboard glass
② Copyboard glass
③ Magnet plate retainer

Figure 4-102

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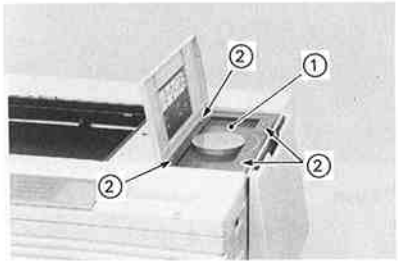
8) Remove the size index plate (vertical).
9) Open the hopper door.
10) Remove the four screws, and remove the hopper cover.



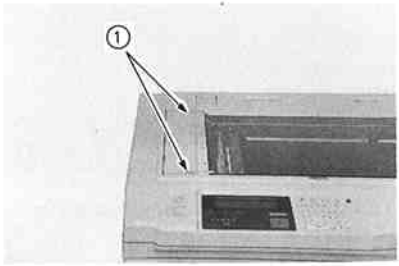
① Hopper cover ② Screws

Figure 4-103

11) Remove the upper cover.

2. Size Index Plate (vertical)

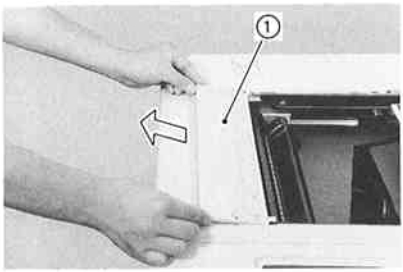
1) Remove the two screws.



① Screws

Figure 4-104

2) Lift one side of the size index plate (vertical), and pull it out.



① Size index plate (vertical)

Figure 4-105

Points to Keep in Mind when Mounting

Make sure that the size index plate (vertical) is in place with its holes over the bosses on the standard white plate.

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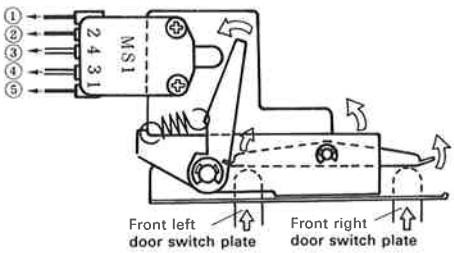
B. Door Switches

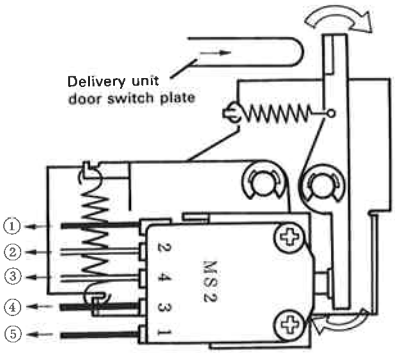
1. Front Door Switch Wiring Diagram



① MS1-1 (black)
② MS2-1 (black)
③ MS2-3 (white)
④ ET101 (white)
⑤ ET100 (black)

Figure 4-106

2. Delivery Unit Door Switch Wiring Diagram

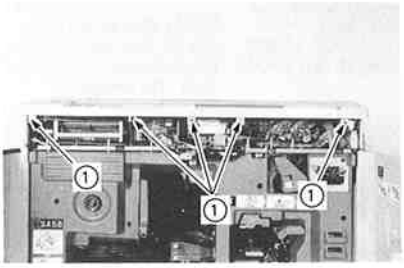


① SW104 (black)
② J702-1 (white)
③ ET104 (white)
④ MS1-4 (black)
⑤ MS1-2 (black)

Figure 4-107

C. Control Panel

1) Open the front doors.
2) Remove the five screws, and remove the upper front panel.
3) Loosen the five screws, and lift the control panel.



① Screws

Figure 4-108

4) Remove the three connectors, and detach the control panel from the copier.

D. Copyboard Cover

1. Replacing the Cushion

The cushion is glued to the copyboard cover with double-sided adhesive tape. Pull on its corner to remove.

Make sure no air is trapped underneath after replacement.

2. Cleaning

Use a dry cloth to clean the cushion. Do not moisten the cloth or use a solvent.

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E. Fans

1. Outline

The copier is equipped with three fans used to circulate the air inside it, thereby preventing rises in temperature.

Each of the fan motors or fans serves the following purpose:

Scanner cooling fan (FM1): Cools the scanner.
Feeder fan (FM2): Feeds the copy paper.
Exhaust fan (FM3): Discharges the air outside the copier.

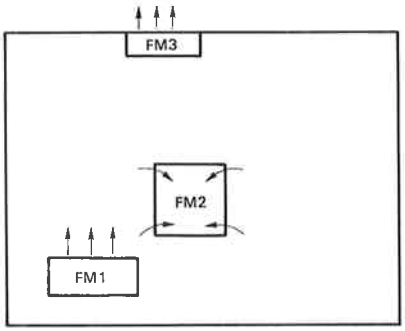
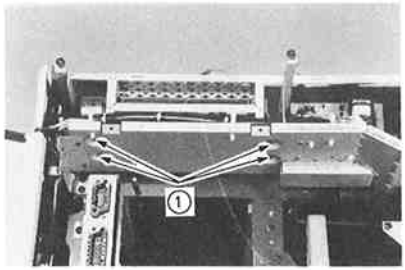


Figure 4-109

2. Removing the Scanner Cooling Fan (FM1)

1) Open the front doors, and remove the upper front panel.
2) Remove the control panel and fixing assembly.
3) Remove the connector.
4) Remove the four screws, and remove the scanner cooling fan.

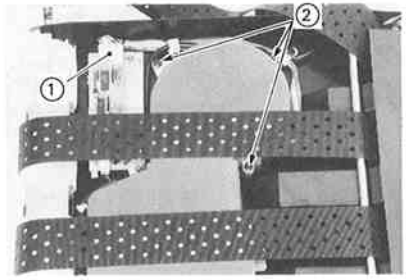


① Screws

Figure 4-110

3. Removing the Feeder Fan

1) Remove the feeder unit from the copier.
2) Remove the feeder belt from the feeder unit.
3) Remove the connector.
4) Remove the three screws, and remove the feeder fan.

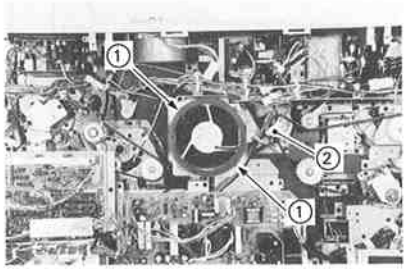


① Connector ② Screws

Figure 4-111

4. Removing the Exhaust Fan

1) Remove the rear panel.
2) Remove the connector.
3) Remove the two screws, and remove the exhaust fan.



① Screws ② Connector

Figure 4-112

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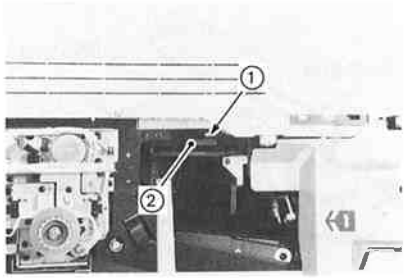
F. Filters

1. Removing the Air Filter

1) Open the front doors, and remove the drum cover.
2) Remove the screw, and pull the air filter to the front.

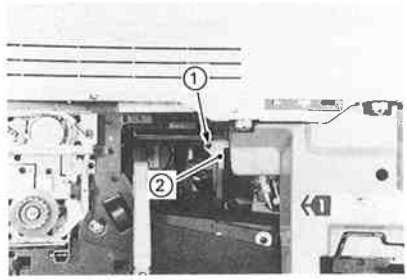


① Screw ② Air filter

Figure 4-113

2. Removing the Ozone Filter in the Feeder Unit

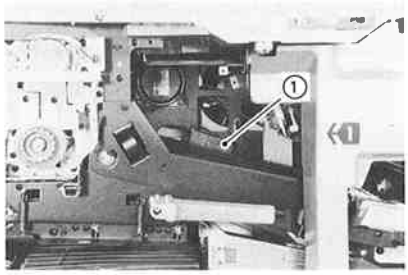
1) Open the front doors, and remove the fixing assembly cover.
2) Remove the screw and partition plate.



① Screw ② Partition plate

Figure 4-114

3) Remove the ozone filter found at the rear of the feeder unit.

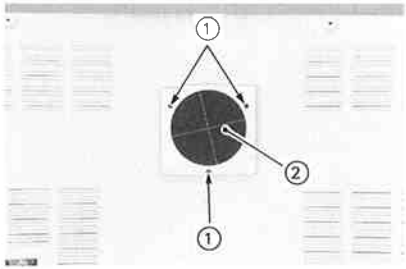


① Ozone filter

Figure 4-115

3. Removing the Ozone Filter on the Rear Panel

1) Remove the rear panel.
2) Remove the three screws, and remove the ozone filter.



① Screws ② Ozone filter

Figure 4-116

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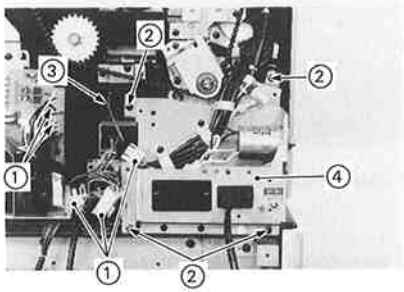
G. Power Cord Mount

1) Remove the rear and upper left panels.
2) Disconnect the five connectors.
3) Remove the screw, and remove the grounding wire.
4) Remove the four screws, and remove the power cord mount.



① Connectors
② Screws
③ Grounding wire
④ Power cord mount

Figure 4-117

H. Servicing Grips

You will find grips on the left side of the pedestal; use the grips to facilitate moving the body.

1) Detach the lower left cover.
2) Remove the two screws, and slide out the grips.

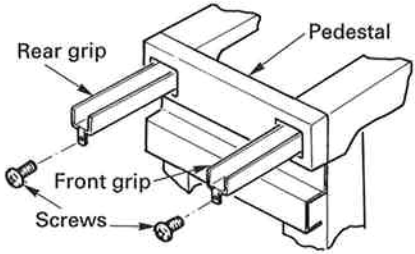


Figure 4-118

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II. DRIVE SYSTEM

A. Lens Drive Unit

> The unit is pre-adjusted at the factory with high precision. Do not remove parts or loosen screws other than those discussed here.

1. Removing the Lens Drive Cable

1) Remove the copyboard cover and copyboard glass.
2) Remove the four screws, and remove the lens upper cover.
3) Remove the lens drive cable.

2. Lubrication

Apply a low-viscosity lubricant uniformly over the lens rail.

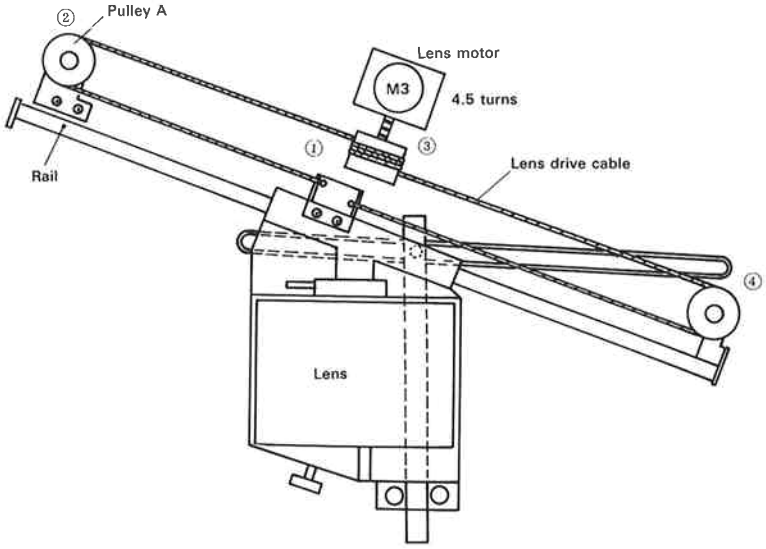

Figure 4-200

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3. Adjusting the Lens Drive Cable

1) Move the lens so that the side of the sensor plate and that of the pulley are in contact with each other.
2) Hook a spring gauge (CK-0054) at the point where the lens drive cable and cam groove plate meet.
3) Fix pulley A in place so that the reading is 600 ±100 g when the lens drive cable is lifted 36 mm off the base plate.

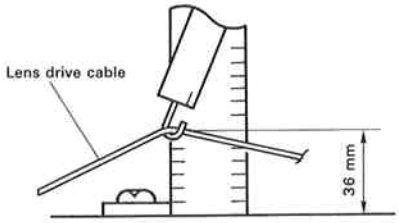

Figure 4-201

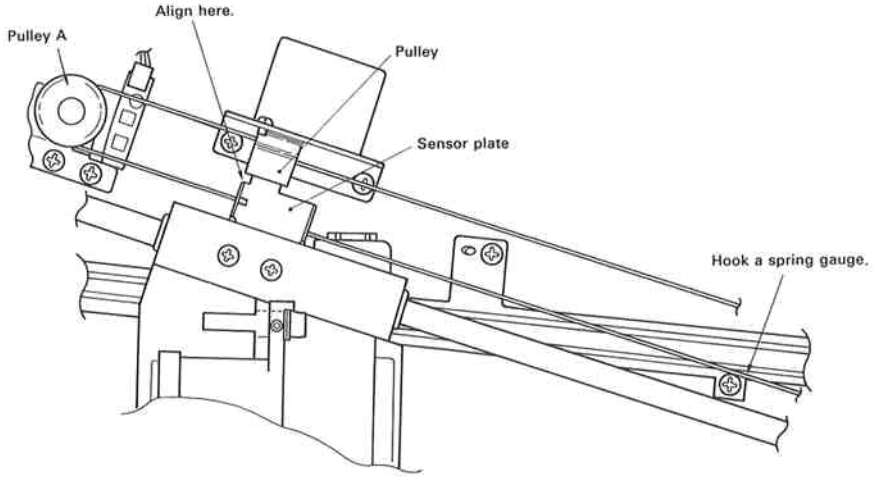

Figure 4-202

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B. Scanner Drive Unit

1. Removing the Mirror Drive Cable

1) Remove the copyboard cover, copyboard glass, and upper, upper left, and rear panels.
2) Remove nut A shown in Figure 4-203.
3) Remove the two screws, and remove the metal fixing. (Do not loosen the hex screw.)
4) Remove the mirror drive cable.

2. Fitting the Mirror Drive Cable

1) Move the mirror 1 mount to the home position.
2) Fit the adjusting screw with nut A.
3) Insert the adjusting screw into the hole in the side plate (left), and fix it in place with nut B.
4) Fit the mirror drive cable in the sequence shown in Figure 4-203.
5) Adjust the cable tension.
6) Adjust the mirror position.

3. Adjusting the Mirror Drive Cable

The tension of the mirror drive cable is adjusted by varying the length of the adjusting screw exposed.

1) Remove the copyboard glass, and move mirror 1 to the left (toward the home position).
2) With a spring gauge, pull the mirror drive cable (middle of length L in Figure 4-204). Adjust the cable so that the reading is 250 ±50 g when the cable has a slack of 60 ±0.5 mm toward the front.

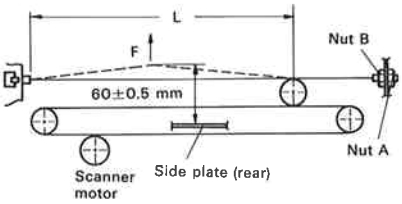

Figure 4-204

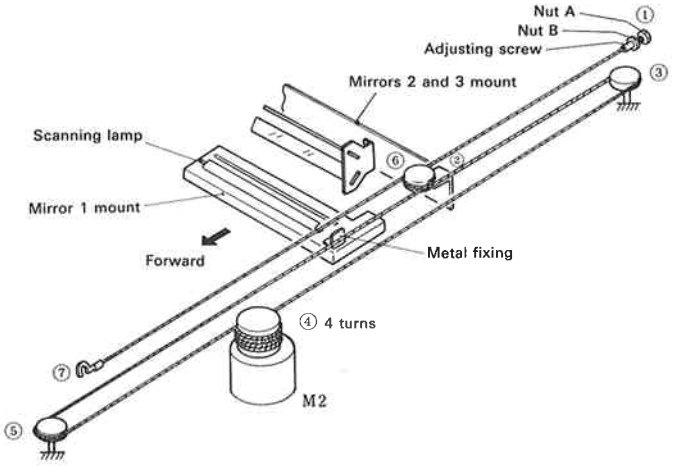

Figure 4-203

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4. Adjusting the Position of the Mirrors (optical path between mirrors 1 and 2)

Adjust the position of the mirrors when the mirror drive cable is replaced.

The position of the mirrors is adjusted by changing the position of the metal fixing on the mirror 1 mount. (Loosen the hex screw.)

Note:
The cable tends to develop a slack in relation to the number of copies made. Adjust the tension in such cases.

1) Take out a sheet of copy paper (A4, A3, letter or ledger), and draw lines 1 cm from both edges as in Figure 4-205.

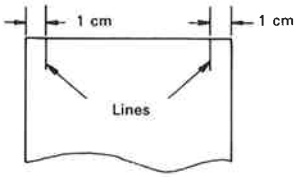


Figure 4-205

2) Use the sheet with lines as a document, and make a copy; refer to the copy as sheet A.
3) Feed the sheet with lines into the copier; refer to the sheet with lines after it has been fed as sheet B. (Use the manual feed mode with a white sheet of paper on the copyboard.)
   ■ The above should eliminate all factors that cause contraction except heat.
4) Align the left lines of sheets A and B, and adjust the position of morror1 so that length x and length y shown in Figure 4-206 are identical.

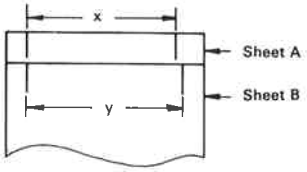


Figure 4-206

X = Y Correct.
X > Y Move mirror 1 mount to a.
X < Y Move mirror 1 mount to b.

Note:
The copy image is enlarged when the distance between mirrors 1 and 2 is small, and reduced if large.

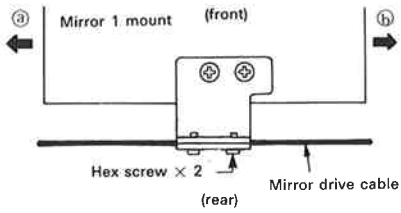


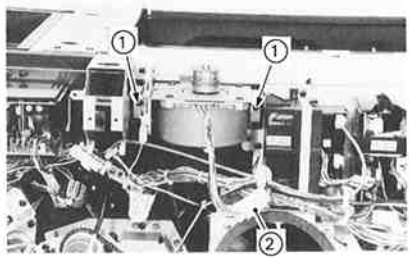
Figure 4-207 Top View

5. Lubrication

Apply a low viscosity lubricant uniformly over the scanner rail after cleaning.

6. Removing the Scanner Motor

1) Remove the copyboard cover, copyboard glass, and upper, upper left and rear panels.
2) Remove the mirror drive cable.
3) Remove the connector and two screws, and remove the scanner motor.



① Screws ② Connector

Figure 4-208

4) Remove the screw, and remove the copyboard cover switch from the scanner motor unit.

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7. Adjusting the Home Position of the Scanning System

Select 'S_BRAKE' in the service mode (☒ 3 ☒).

Change the settings with input keys so that the scanner stops at its home position 13 mm to 16.5 mm from the side plate (left); thereafter, press the # key.

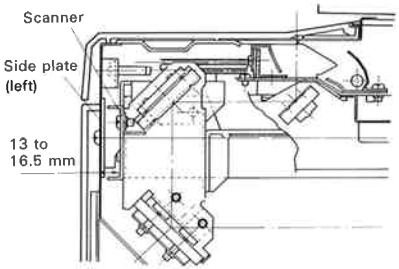
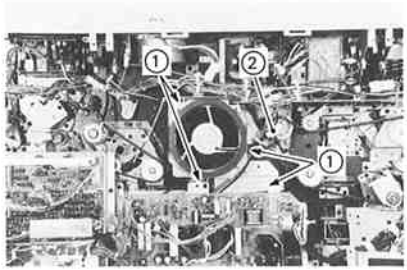


Figure 4-209

C. Main Motor Unit

1. Removing the Main Motor Unit

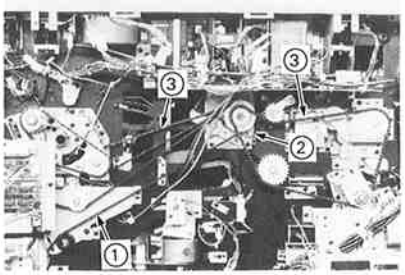
1) Remove the rear panel.
2) Remove the DC power supply PCB.
3) Remove the four screws and connector, and remove the fan mount.



① Screws ② Connector

Figure 4-210

4) Unhook the spring from the tension sprocket plate of the chain, and detach the chain.
5) Loosen the screws on the tension pulley plate for the drive belt, and detach the drive belt.
6) Unhook the spring from the tension sprocket plate of the chain, and detach the chain.



① Drive belt ③ Chains
② Spring

Figure 4-211

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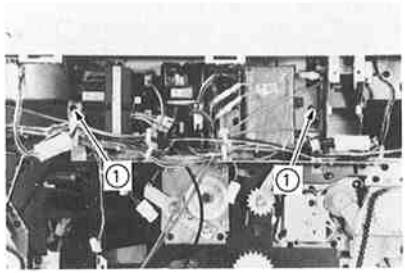
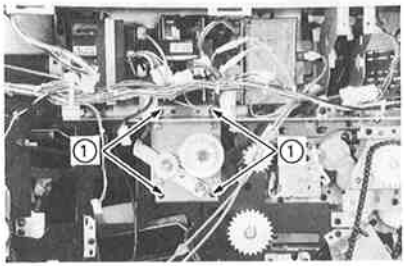
7) Remove the two screws of the high-voltage transformer unit.



① Screws

Figure 4-212

8) Pull out the connector.
9) Remove the four screws, and remove the main motor unit.



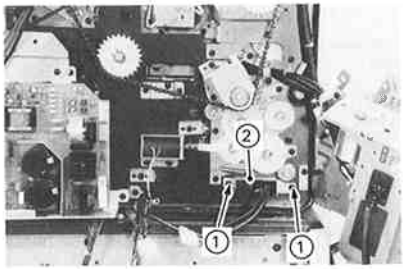
① Screws ② Connector

Figure 4-213

D. Normal/Reverse Rotation Roller Drive Unit

1. Removing the Normal/Reverse Rotation Roller Unit

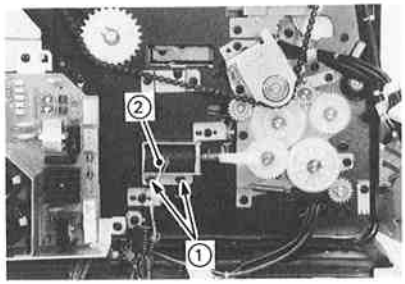
1) Remove the rear and upper left panels.
2) Remove the power cord mount.
3) Remove the two screws, and remove the cord cover.



① Screws ② Cord cover

Figure 4-214

4) Remove the two screws, and remove the solenoid.
5) Remove the three screws, and remove the normal/reverse rotation roller drive unit.



① Screws ② Solenoid

Figure 4-215

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2. Positioning the Normal/Reverse Rotation Switching Solenoid

Move the solenoid with the plunger pushed in, and fix the solenoid in place with gears A and B in contact with each other.

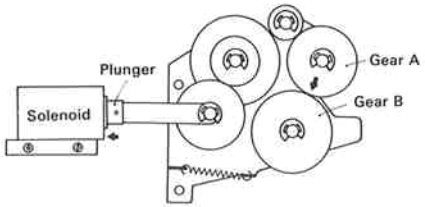
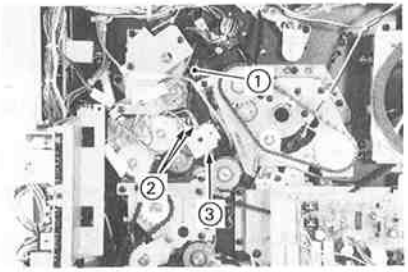


Figure 4-216

E. Black Developing Assembly Release Drive Unit

1. Removing the Black Developing Assembly Release Drive Unit

1) Remove the rear panel.
2) Open the motor driver PCB.
3) Loosen the hex screw.
4) Pull out the two fastons.
5) Remove the screw, and remove the black developing assembly release drive unit.

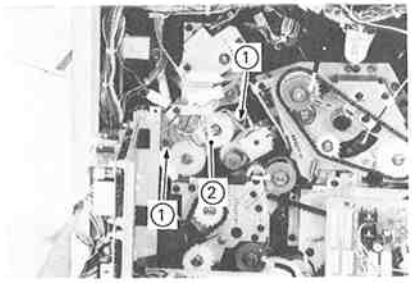


① Hex screwdriver ③ Screw
② Fastons

Figure 4-217

2. Removing the Cams

1) Open the front doors, and remove the developing assembly.
2) Remove the rear panel.
3) Open the motor driver PCB.
4) Remove the two screws, and remove the idler gear unit.



① Screws ② Idler gear unit

Figure 4-218

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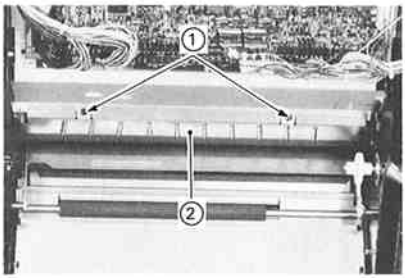
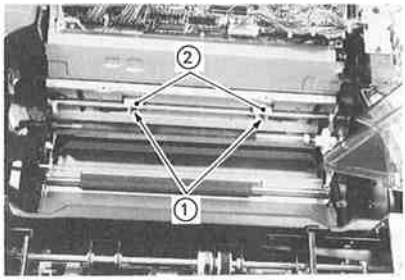
5) Remove the cassette holder.
6) Remove the two screws, and remove the paper guide plate.



① Screws ② Paper guide plate

Figure 4-219

7) Remove the screws, and remove the cams.



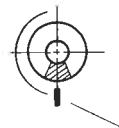
① Screws ② Cams

Figure 4-220

3. Adjusting the Black Developing Assembly Release Solenoid

1) Move the black developing assembly release solenoid so that the center of the screw is aligned with the reference line, and screw it in place. (See Figure 4-222.)
2) Turn the copier ON.
3) View the rail mount of the developing assembly from the front, and check the position of the developing assembly when it stops with reference to the engagement index.

a. Correct



Standard position (marked) at center.

b. Excessive Rotation

Standard position (marked) on left.

c. Inadequate Rotation

Standard position on right.

Figure 4-221

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If the position is not correct, perform step 4) and onward.

4) Turn the copier OFF.
5) Loosen the screw on the solenoid, and make adjustments.

a. If excessive, move it to direction A of Figure 4-222.
b. If inadequate, move it to direction B of Figure 4-222.

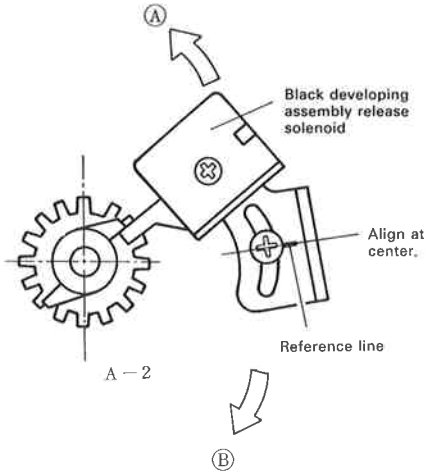


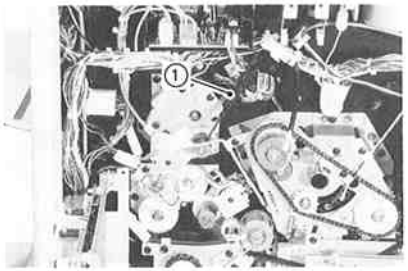
Figure 4-222

6) Repeat step 2) onward.
The distance between the black developing assembly and drum increases if the black developing release solenoid is not positioned correctly, and this condition can lead to poor density.

F. CD Unit Engagement Drive Unit

1. Removing the CD Unit Engagement Drive Unit

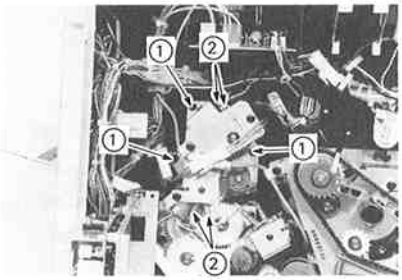
1) Remove the rear panel.
2) Open the motor driver PCB.
3) Loosen the hex screw.



① Hex screwdriver

Figure 4-223

4) Pull off the four fastons.
5) Remove the three screws, and remove the CD unit engagement drive unit.



① Screws ② Fastons

Figure 4-224

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III. FEED SYSTEM

A. Paper Pick-Up Unit

1. Construction

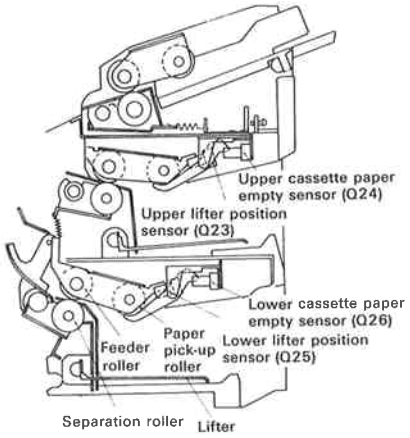


Figure 4-300

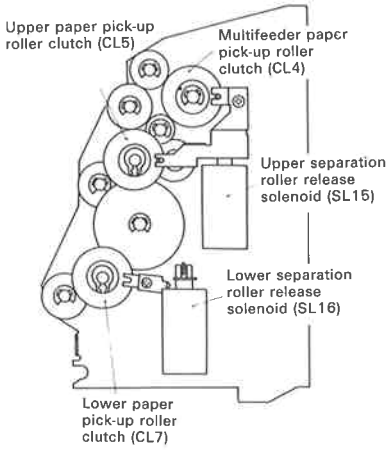
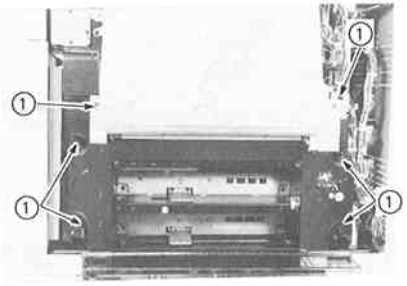

Upper paper pick-up roller clutch (CL5)
Multifeeder paper pick-up roller clutch (CL4)
Upper separation roller release solenoid (SL15)
Lower separation roller release solenoid (SL16)
Lower paper pick-up roller clutch (CL7)

Figure 4-301

2. Removing the Cassette Holder

1) Remove the upper right panel.
2) Pull out connectors J108 and J109 from the DC controller PCB.
3) Mark the position of the cassette holder with a scriber.
4) Remove the six screws, and remove the cassette holder.

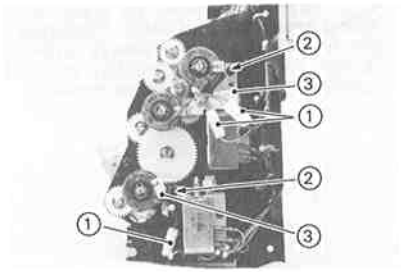


① Screws

Figure 4-302

3. Removing the Paper Pick-Up Roller Clutch

1) Remove the cassette holder from the copier.
2) Pull out the connectors.
3) Remove the screws, and remove the clutch stop plates.



① Connectors
② Screws
③ Clutch stop plates

Figure 4-303

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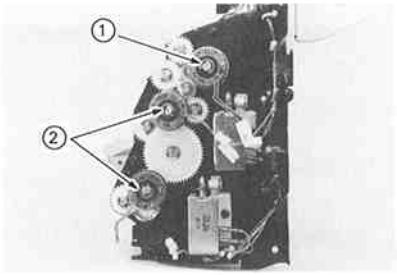
4) Remove the grip ring or E-rings, and remove the paper pick-up roller clutch.

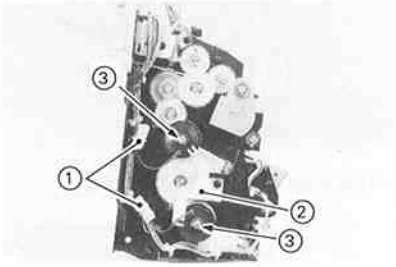


① Grip ring ② E-rings

Figure 4-304

4. Removing the Upper and Lower Lifter Clutches

1) Remove the paper cassette holder from the copier.
2) Pull out the connectors.
3) Remove the screw, and remove the clutch stop plate.
4) Remove the E-ring, and remove the lifter clutch.

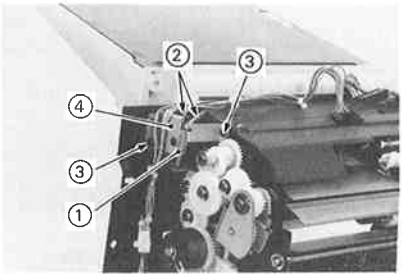


① Connectors ③ E-rings
② Clutch stop plate

Figure 4-305

5. Removing the Multifeeder Lifter Clutch

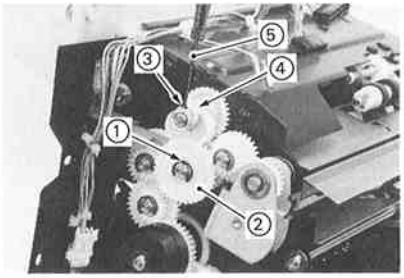
1) Remove the paper cassette holder from the copier.
2) Remove the spring.
3) Pull out the two fastons from the solenoid.
4) Remove the two screws, and remove the solenoid mount.



① Spring ③ Screws
② Fastons ④ Solenoid mount

Figure 4-306

5) Remove the E-ring, and remove the gear.
6) Loosen the hex screws, and remove the lifter clutch.



① E-ring ④ Lifter clutch
② Gear ⑤ Hex screwdriver
③ Hex screw

Figure 4-307

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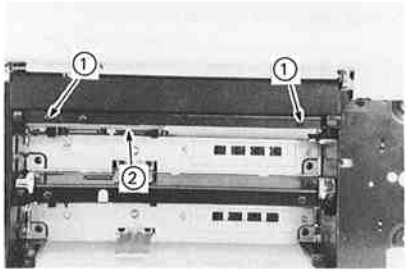
6. Removing the Upper Cassette Paper Pick-Up Roller

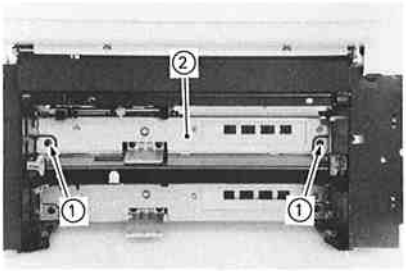
1) Remove the paper cassette holder from the copier.
2) Remove the two screws, and remove upper paper pick-up guide plate II.



① Screws ② Upper paper pick-up guide plate II

Figure 4-308

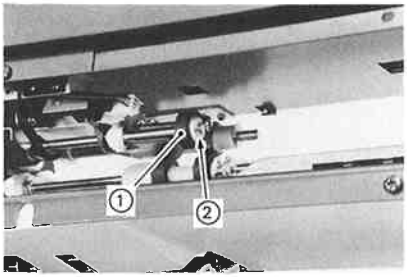
3) Remove the two screws, and remove upper paper pick-up guide I.



① Screws ② Upper paper pick-up guide plate I

Figure 4-309

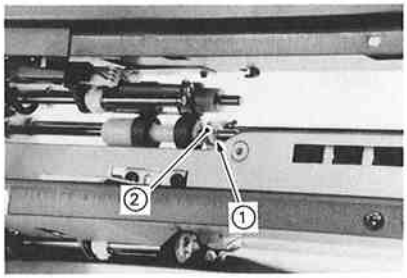
4) Remove the retaining ring, and remove the two upper paper pick-up rollers. Take care not to lose the pin.



① Upper paper pick-up roller ② Retaining ring

Figure 4-310

5) Remove the retaining ring with a finger or wrench, and remove the bushing.



① Retaining ring ② Bushing

Figure 4-311

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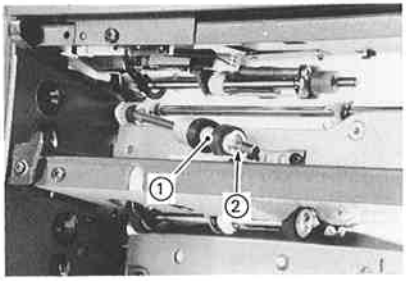
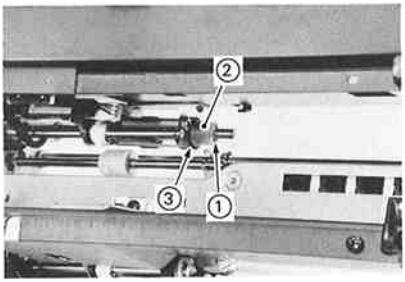
6) Detach the bushing from the guide plate, and slide the separation roller spindle to the front.
7) Remove the retaining ring, and remove the separation roller.



① Separation roller ② Retaining ring

Figure 4-312

8) Remove the retaining ring, and remove the one-way clutch and feeder roller.

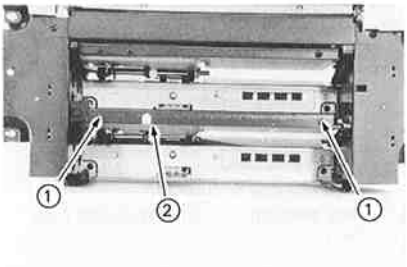


① Retaining ring ③ Feeder roller
② One-way clutch

Figure 4-313

7. Removing the Lower Paper Pick-Up Roller

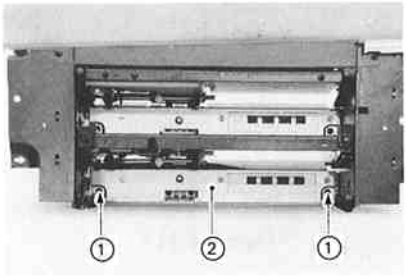
1) Remove the paper pick-up unit from the copier.
2) Remove the two screws, and remove lower paper pick-up guide plate II.



① Mounting screws ② Lower paper pick-up guide plate II

Figure 4-314

3) Remove the two screws, and remove lower paper pick-up guide plate I.



① Mounting screws ② Lower paper pick-up guide I

Figure 4-315

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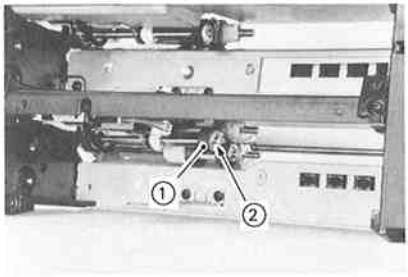
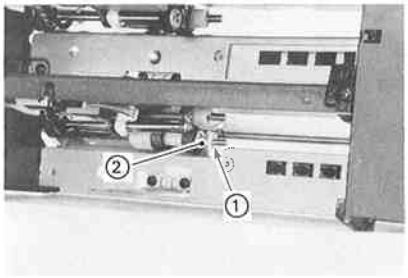
4) Remove the retaining ring, and remove the two lower paper pick-up rollers.



① Paper pick-up roller ② Retaining ring

Figure 4-316

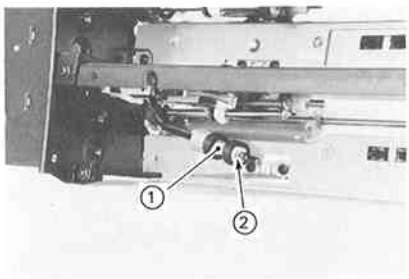
5) Remove the retaining ring with a finger or wrench, and remove the bushing.



① Retaining ring ② Bushing

Figure 4-317

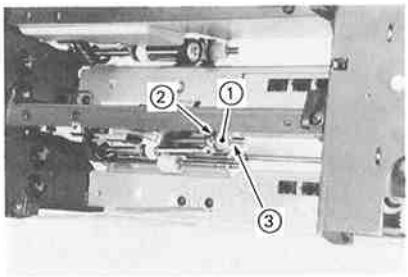
6) Detach the bushing from the guide plate, and slide the separation roller spindle to the front.
7) Remove the retaining ring, and remove the separation roller.



① Separation roller ② Retaining ring

Figure 4-318

8) Remove the retaining ring, and remove the one-way clutch and feeder roller.



① One-way clutch ③ Retaining ring
② Feeder roller

Figure 4-319

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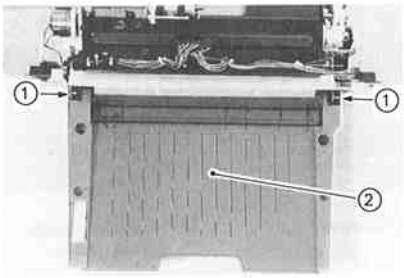
8. Removing the Multifeeder Paper Pick-Up Rollers

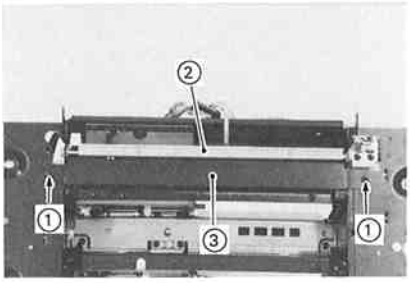
1) Remove the cassette holder from the copier.
2) Remove the two screws, and remove the multifeeder tray.



① Stepped screws ② Multifeeder tray

Figure 4-320

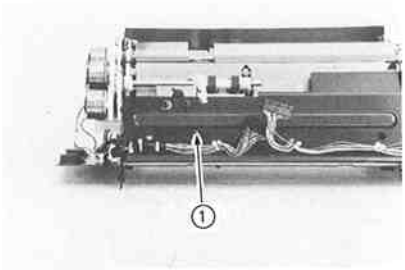
3) Remove the two screws, and remove the blanking plate.
4) Remove the two screws, and remove the multifeeder lifter.



① Screws ③ Blanking plate
② Multifeeder lifter

Figure 4-321

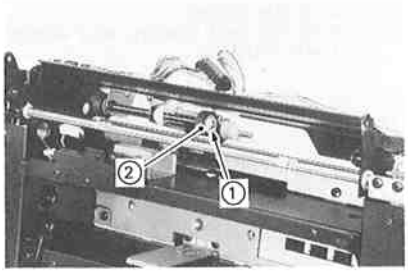
5) Remove the screw, and remove the detection lever mount.



① Screw

Figure 4-322

6) Remove the retaining ring, and remove the paper pick-up roller.



① Retaining ring ② Paper pick-up roller

Figure 4-323

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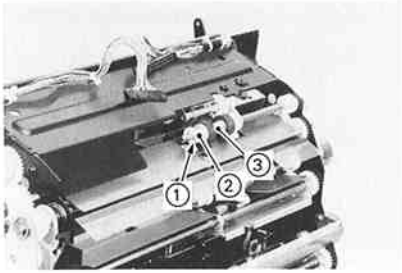
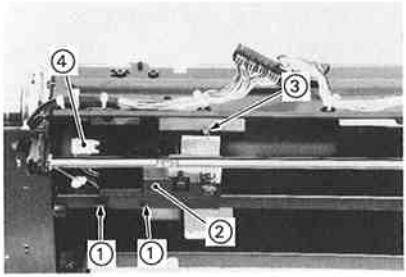
7) Remove the retaining ring with a finger or wrench, and remove the one-way clutch and feeder roller.



① Retaining ring
② One-way clutch
③ Feeder roller

Figure 4-324

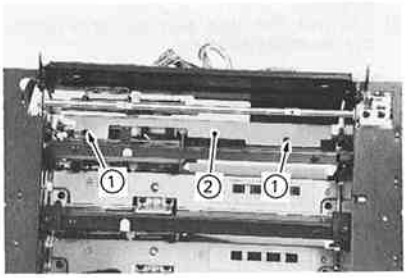
8) Pull out the connector.
9) Remove the spring.
10) Remove the two screws, and remove the sensor mount.



① Screws
② Connector
③ Spring
④ Sensor mount

Figure 4-325

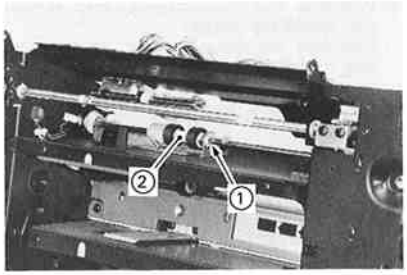
11) Remove the two screws, and remove the paper pick-up guide plate.



① Screw
② Paper pick-up guide plate

Figure 4-326

12) Remove the retaining ring, and remove the bushing.



① Retaining ring
② Bushing

Figure 4-327

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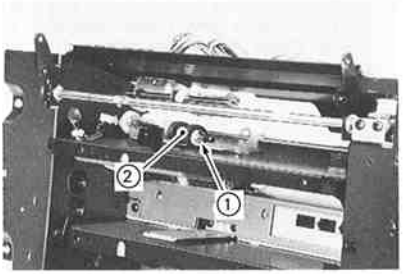
13) Detach the bushing from the guide plate, and slide the separation roller spindle to the front.
14) Remove the retaining ring, and remove the separation roller.



① Retaining ring ② Separation roller

Figure 4-328

9. Adjusting the Stroke for the Upper and Lower Paper Pick-Up Roller Release Solenoids

Mount the solenoid so that the stroke of the solenoid plunger is 5.5 ±0.2 mm.

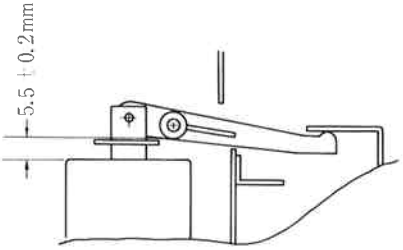
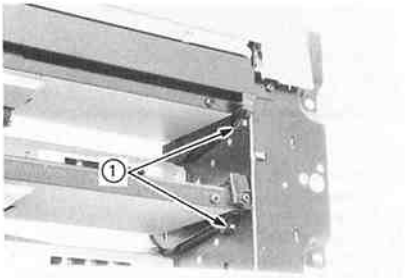


Figure 4-329

10. Releasing the Lifter

The lifter can be moved freely up and down by pushing up the levers shown in Figure4-330.



① Levers

Figure 4-330

11. Lubrication

Lubricate the one-way clutches with a low viscosity lubricant on a periodical basis.

12. Mounting the Paper Pick-Up Rollers

Mount the paper pick-up rollers in the correct orientation as in Figure 4-331.

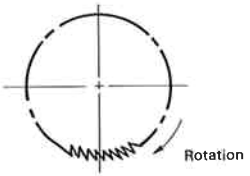


Figure 4-331

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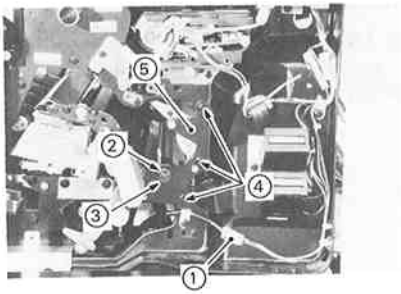
B. Lower Transfer Guide Plate Unit

1. Removing the Lower Transfer Guide Plate

> The lower transfer guide plate can be removed without removing the drum first. Remove the drum nevertheless to avoid damage to the drum while handling the guide plate.

1) Remove the paper pick-up unit.
2) Remove the drum and lower inside covers.
3) Release the feeder unit.
4) Remote the connector.
5) Remove the E-ring and bushing.
6) Remove the three screws, and remove the fixing plate from the lower transfer guide unit.
   Note:
   The center paper guide plate comes off as the fixing plate is removed. Support the guide plate when removing the fixing plate.



① Connector
② E-ring
③ Bushing
④ Screw
⑤ Fixing plate

Figure 4-332

7) Remove the lower transfer guide plate unit.

Figure 4-333

2. Points to Keep in Mind When Mounting the Lower Transfer Guide Unit

a. When mounting the lower transfer guide plate unit, make sure that it is securely fitted over the pins at the rear of the No. 2 paper pick-up unit.
b. When mounting or removing the lower transfer guide unit, make sure that the black sheet does not come into the drum.

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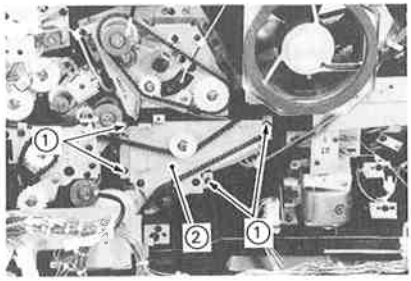
C. Feeder Unit

1. Removing the Feeder Unit

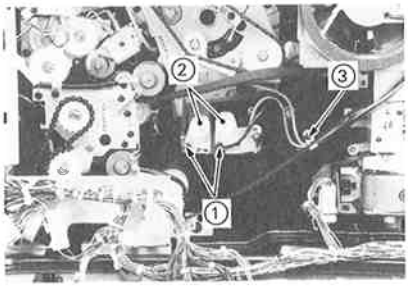
1) Remove the paper pick-up unit.
2) Remove the primary, pre-transfer, and separation/transfer corona units.
3) Remove the drum, drum cleaning unit and fixing assembly.
4) Remove the lower transfer guide plate unit.
5) Remove the rear panel.
6) Remove the DC power supply PCB.
7) Remove the motor driver PCB.
8) Detach the timing belt.
9) Remove the four screws, and remove the tension plate.



① Screws ② Tension plate

Figure 4-334

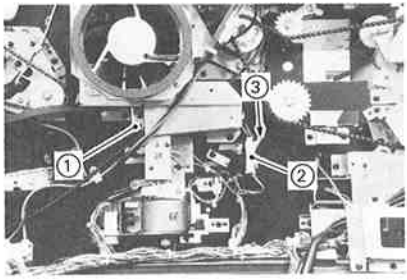
10) Remove the two screws, and remove the two high-voltage connectors.
Do not remove the clamp shown in Figure 4-335.



① Screw ③ Clamp
② High-voltage connector

Figure 4-335

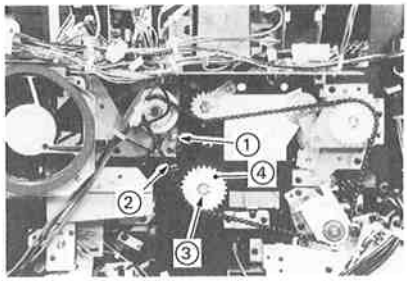
11) Remove the screw, and remove the feeder unit stop plate.
12) Remove the three connectors.
13) Remove the screw, and remove the grounding wire.



① Feeder unit stop plate ③ Grounding wire
② Connector

Figure 4-336

14) Remove the spring, and detach the chain.
15) Remove the grip ring, and remove the sprocket.



① Spring ③ Grip ring
② Chain ④ Sprocket

Figure 4-337

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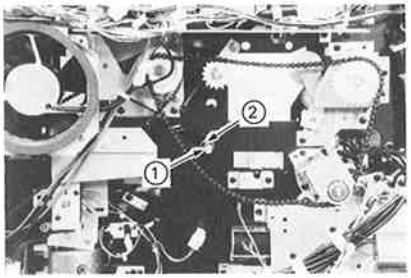
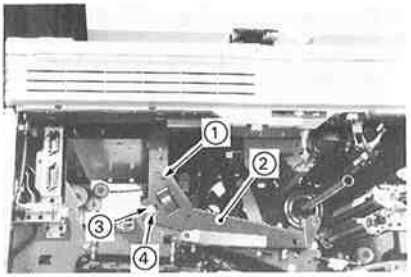
16) Remove the E-ring, and remove the bushing.



① Bushing ② E-ring

Figure 4-338

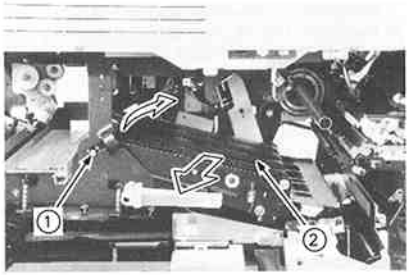
17) Remove the two screws, and remove the cleaner centering plate.
18) Remove the E-ring, and remove the bushing.



① Screw ③ E-ring
② Cleaner centering plate ④ Bushing

Figure 4-339

19) Tilt the feeder unit with its fixing assembly side up, and remove the drive shaft from the side plate of the copier.
20) Remove the feeder unit from the copier.

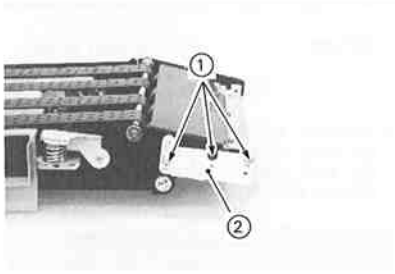


① Drive shaft ② Feeder unit

Figure 4-340

2. Detaching the Feeder Belts

1) Remove the feeder unit from the copier.
2) Remove the three screws, and remove the high-voltage connector mount and leaf spring.



① Screws ② High-voltage connector plate

Figure 4-341

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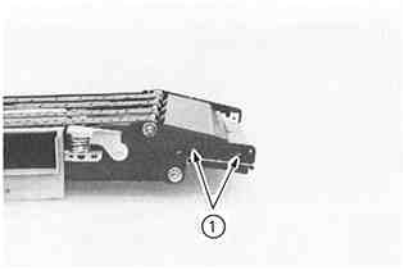
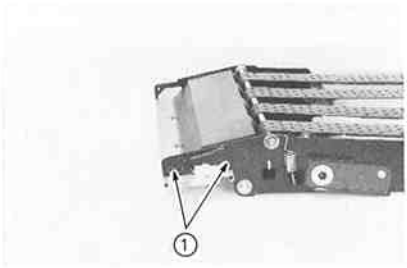
3) Remove the two screws.



① Screws

Figure 4-342

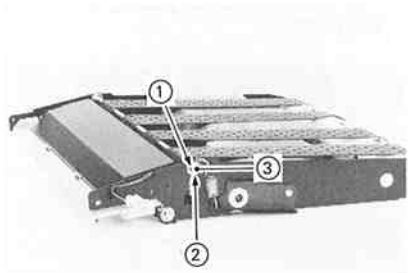
4) Remove the two screws.



① Screws

Figure 4-343

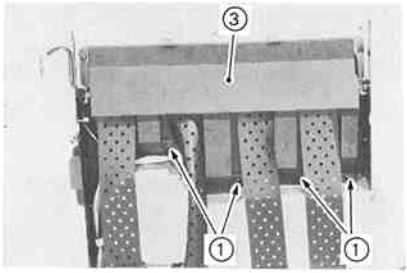
5) Remove the E-ring, and remove the ball bearing and rod.



① E-ring
② Ball bearing
③ Rod

Figure 4-344

6) Remove the four screws and connector, and remove the duct.



① Screws
② Connector
③ Duct

Figure 4-345

7) Detach the feeder belts.

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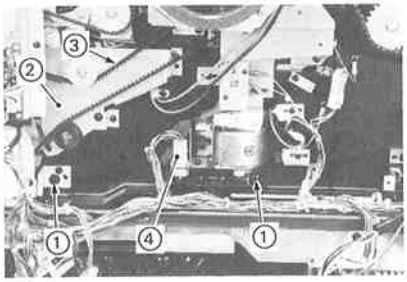
D. No. 2 Paper Pick-Up Unit

1. Removing the No. 2 Paper Pick-Up Unit

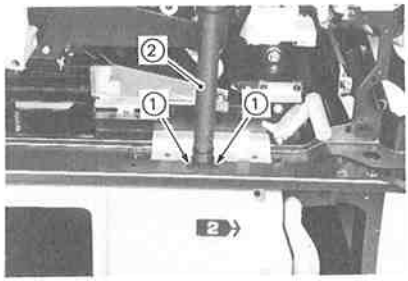
1) Remove the paper pick-up unit.
2) Remove the rear panel.
3) Remove the DC power supply PCB.
4) Loosen the screw on the tension pulley plate, and detach the drive belt.
5) Remove the three screws and two connectors.



① Screws
② Tension pulley plate
③ Drive belt
④ Connector

Figure 4-346

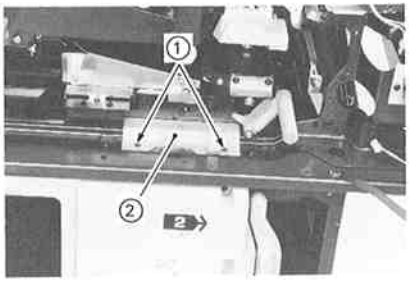
6) Remove the lower transfer guide plate.
7) Remove the two screws, and remove the waste toner tube.



① Screws
② Waste toner tube

Figure 4-347

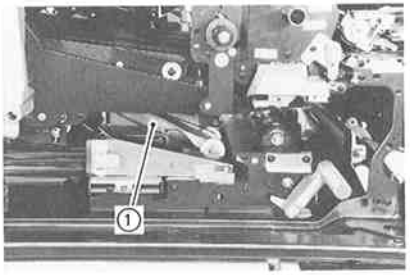
8) Remove the two screws, and remove the fixing plate.



① Screws
② Fixing plate

Figure 4-348

9) Tape the paper pick-up roller unit on the feeder unit.



① Paper pick-up roller unit

Figure 4-349

10) Pull the No. 2 paper pick-up unit out to the front.

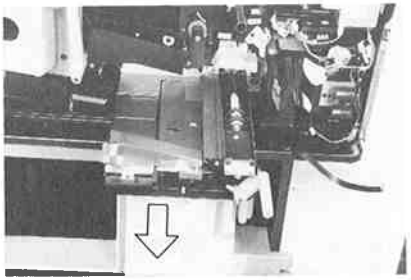


Figure 4-350

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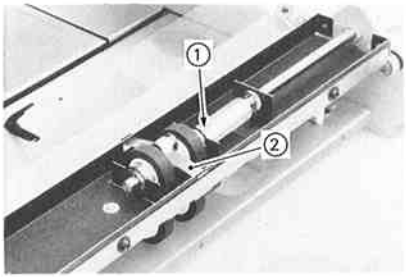
2. Removing the Feeder Roller

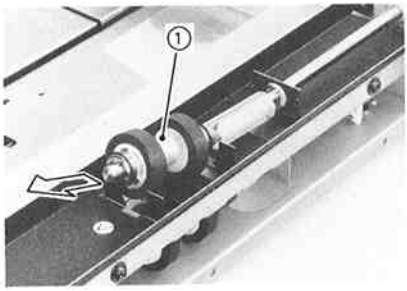
1) Turn the coupling so that its groove is up.
2) Remove the leaf spring. (Avoid deforming the leaf spring.)



① Groove ② Leaf spring

Figure 4-351

3) Remove the feeder roller.

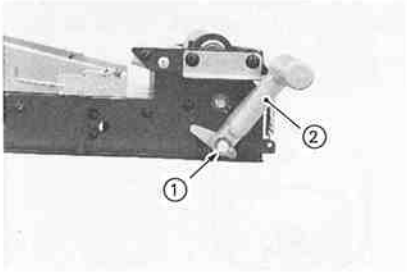


① Feeder roller

Figure 4-352

3. Removing the Separation Roller

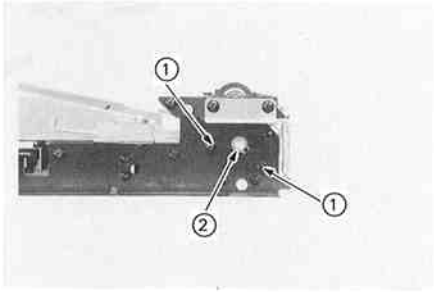
1) Remove the E-ring, and remove the release lever.



① E-ring ② Release lever

Figure 4-353

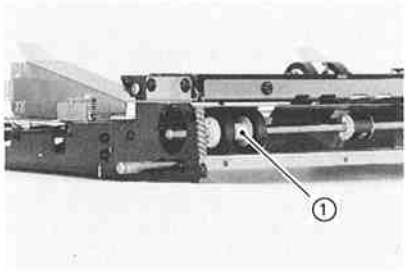
2) Remove the two screws, and remove the bushing plate.



① Screws ② Bushing plate

Figure 4-354

3) Pull out the collar, and pull out the separation roller.



① Separation roller

Figure 4-355

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4. Removing the Tray Guide Plate Drive Cable

1) Remove the No. 2 paper pick-up unit from the copier.
2) Turn over the No. 2 paper pick-up unit.
3) Remove the springs shown in Figure 4-356.
4) Remove the screws shown in Figure 4-356, and detach the drive cable.

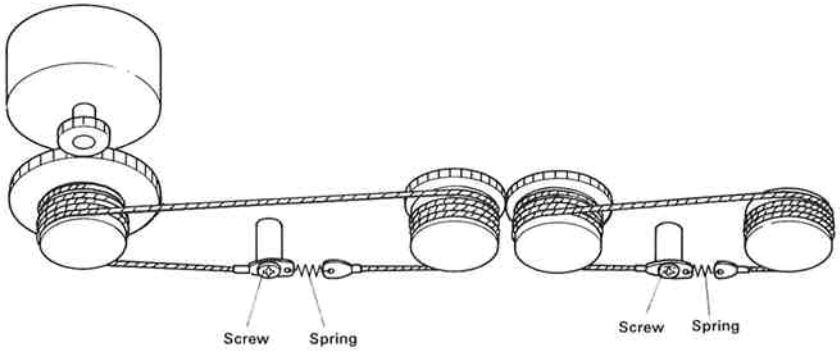

Figure 4-356

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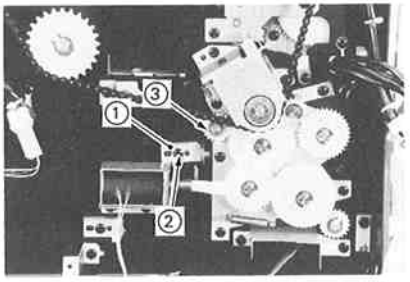
E. No. 2 Feeder Unit

1. Removing the No. 2 Feeder Unit

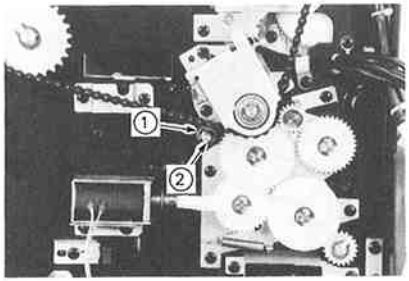
1) Remove the rear panel.
2) Remove the DC power supply unit.
3) Remove the power cord mount.
4) Remove the screw, and remove the metal fixing from the No. 2 feeder unit (lower).
5) Remove the grip ring, and remove the gear.



① Metal fixing ③ Gear
② Screw

Figure 4-357

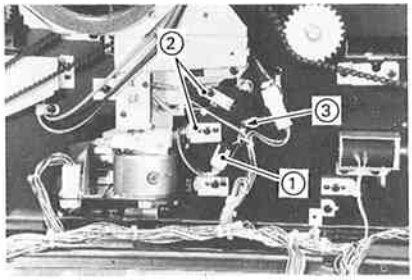
6) Remove the E-ring, and remove the bushing.



① E-ring ② Bushing

Figure 4-358

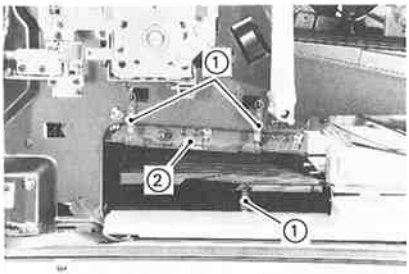
7) Pull out the connector (4P), and remove the grounding wire.
8) Remove the screw, and remove the metal fixings.



① Connector ③ Grounding wire
② Metal fixings

Figure 4-359

9) Open the front doors, and remove the fixing assembly cover.
10) Remove the three springs.



① Springs ② No. 2 feeder unit (lower)

Figure 4-360

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11) Pull the No. 2 feeder unit (lower) out to the front of the copier.

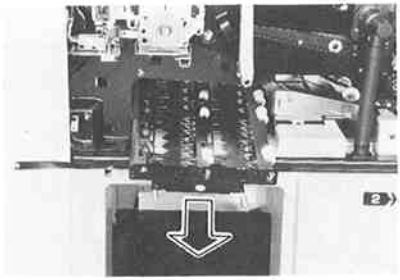
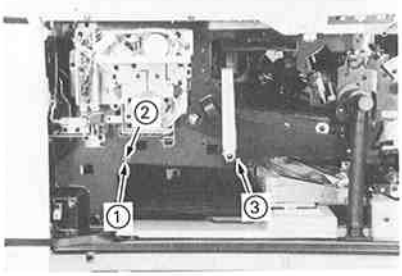


Figure 4-361

12) Remove the waste toner tube.
13) Remove the E-ring, and remove the bushing.
14) Remove the stepped screw. Take care not to lose the spacer.



① E-ring
② Bushing
③ Stepped screw

Figure 4-362

15) Push the No. 2 feeder unit (upper) toward the rear of the copier, and remove the drive shaft from the side plate (front).
16) Pull the No. 2 feeder unit (upper) out to the front of the copier. (Take care not to damage the static eliminator at the bottom.)

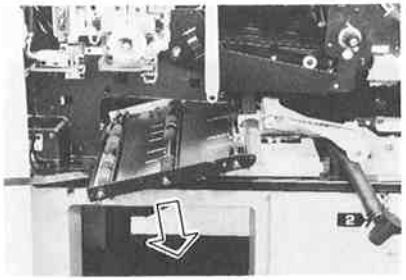


Figure 4-363

2. Mounting the Paper Pick-Up Roller Release Solenoid (SL9)

Mount the solenoid plate so that the clearance is as shown in Figure 4-364 when the solenoid plunger is pushed in. (Measure the clearance keeping the paper pick-up roller lowered and with a gap at A.)

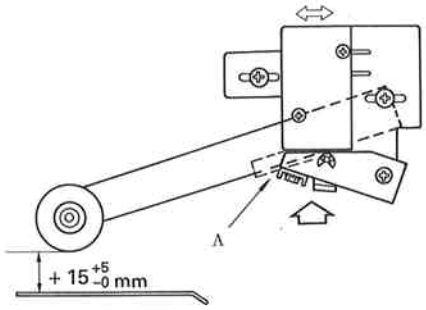


Figure 4-364

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3. Mounting the No. 3 and 4 Paper Deflector Solenoids

Mount the solenoid so that the clearance is as shown in Figure 4-365 when the solenoid plunger is pushed in.

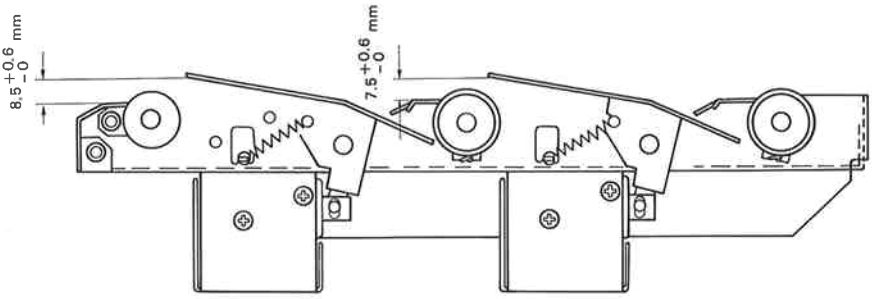
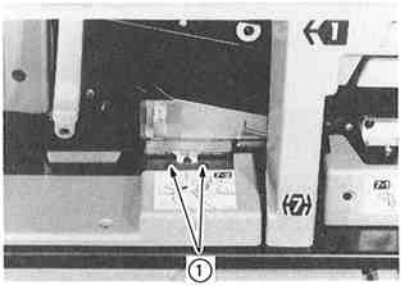


Figure 4-365

4. Left/Right Registration (position of No. 2 paper pick-up unit; 2nd side of two-sided/overlay copy)

Select 'ERASE' in the service mode (☒ 5 ☒), and enter '1'.

Move the position of the guide plate of the No. 2 paper pick-up unit, and adjust it so that the edge of the copy image and that of the copy paper is 0 ±2.5 mm in the DIRECT copy mode.



① Screws

Figure 4-366

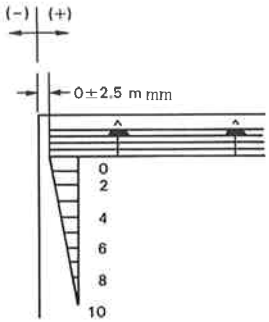


Figure 4-367

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F. Paper Delivery Unit

1. Construction

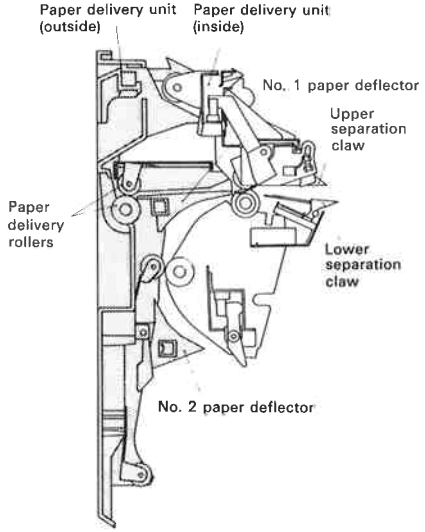


Figure 4-368 NP-6650

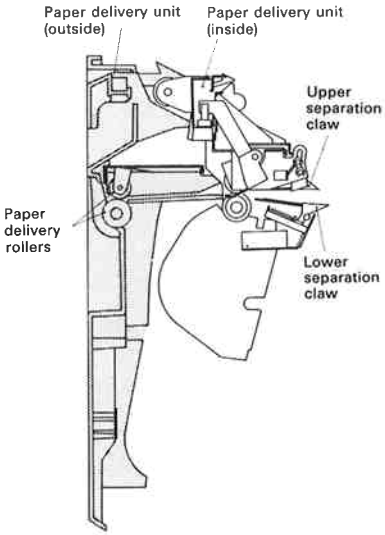
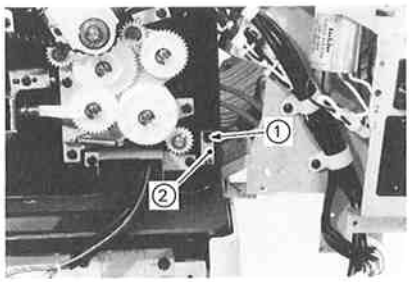


Figure 4-369 NP-6150

2. Removing the Outside Paper Delivery Unit

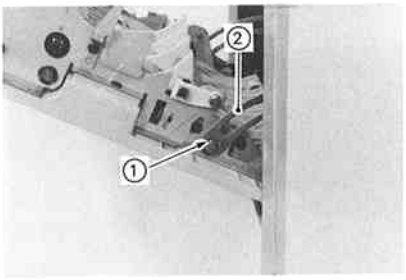
1) Remove the rear panel.
2) Remove the power cord mount.
3) Remove the screw, and remove the positioning plate.



① Screw ② Positioning plate

Figure 4-370

4) Open the outside paper delivery unit and front doors.
5) Remove the fixing assembly cover.
6) Remove the E-ring, and remove the link. (both front and rear). Work while supporting the outside paper delivery unit with a hand.



① E-ring ② Link

Figure 4-371 (front)

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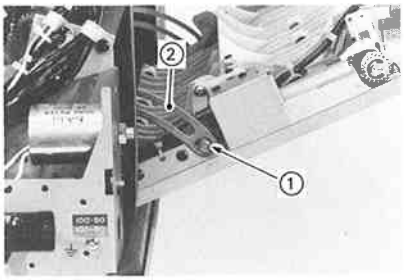
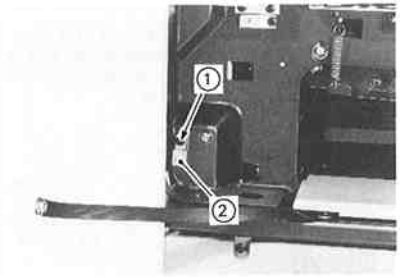


① E-ring ② Link

Figure 4-372 (rear)

6) Remove the screw and the positioning plate, and remove the outside paper delivery unit.

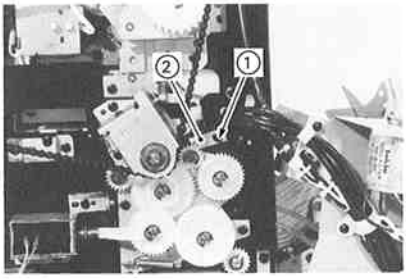


① Screw ② Positioning plate

Figure 4-373

3. Removing the Inside Paper Delivery Unit

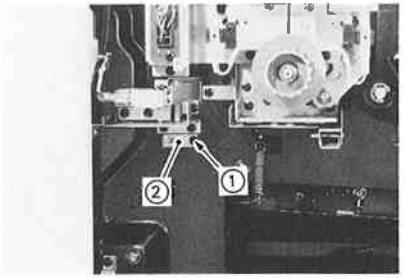
1) Remove the rear panel.
2) Remove the power cord mount.
3) Remove the grounding wire.
4) Remove the screw, and remove the positioning plate.



① Screw ② Positioning plate

Figure 4-374

5) Open the outside paper delivery unit and front doors.
6) Remove the fixing assembly cover.
7) Remove the screw, and remove the positioning plate.



① Screw ② Positioning plate

Figure 4-375

8) Open and remove the inside paper delivery unit. The inside paper delivery unit may be hot; take care to avoid burns.

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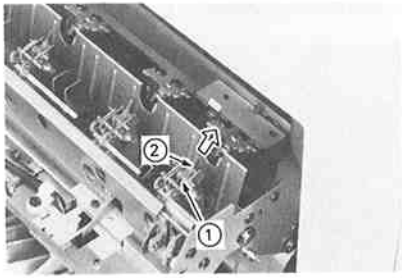
4. Removing the Upper Separation Claw

1) Open the outside and inside paper delivery units.
2) Pull the upper separation claw up with the spring lifted slightly.

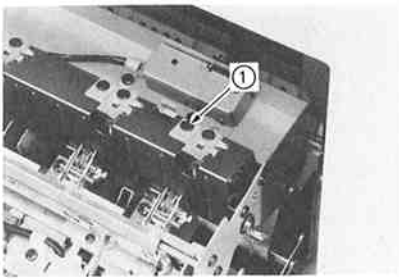


① Spring ② Upper separation claw

Figure 4-376

5. Removing the Lower Separation Claw

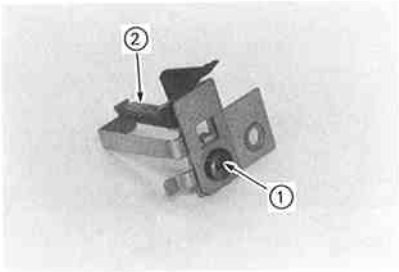
1) Open the outside and inside paper delivery units.
2) Remove the screw, and remove the lower separation claw unit.



① Screw

Figure 4-377

3) Remove the screw and spring, and remove the lower separation claw.



① Screw ② Spring

Figure 4-378

6. Mounting the No. 1 Paper Deflector Solenoid (SL11)

Mount the solenoid so that the No. 1 paper deflector and the guide plate are 0.5 mm to 1 mm from each other when the solenoid plunger is pushed in.

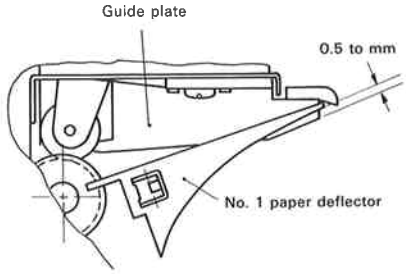


Figure 4-379

7. Mounting the No. 2 Paper Deflector Solenoid (SL12)

Mount the solenoid so that the stroke of the solenoid plunger is 3 ±0.2 mm.

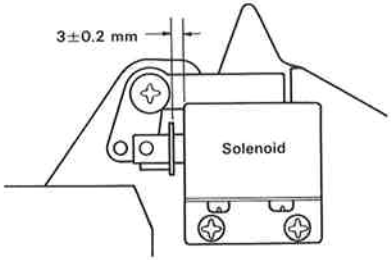


Figure 4-380

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8. Cleaning

Dirt or wear on the separation claw or damage to its tip can soil the copy paper, cause jams, or scratch the fixing roller. Wipe the claws with lint-free paper or dry cloth on a periodical basis. If toner has melted and stuck on it, use lint-free paper moistened with cleaning oil.

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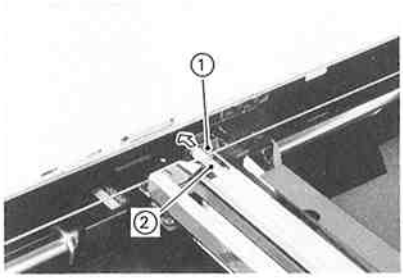
IV. EXPOSURE SYSTEM

A. Scanning Lamp

1. Removing the Scanning Lamp

1) Remove the copyboard glass.
2) Move the mirror 1 mount to the center.
3) Open the terminal slightly with a flat-blade screwdriver, and remove the scanning lamp.



① Terminal ② Scanning lamp

Figure 4-400

Note:
1. Wait until the scanning lamp has cooled sufficiently.
2. Do no leave finger prints on the scanning lamp.
3. Clean the scanning lamp if soiled.

2. Adjusting the Position of the Side Reflector Plate

If the side reflector plate on the mirror 1 mount is moved in the direction of the arrow (Figure 4-401), the copy toward the front (or rear) will be darker.

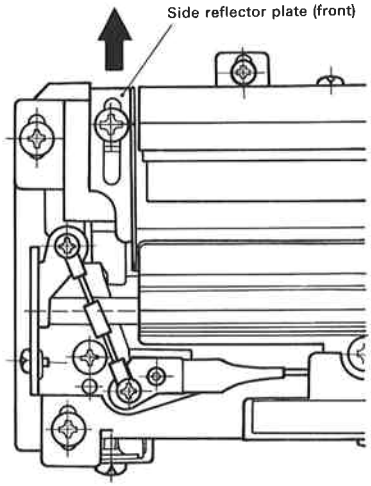


Figure 4-401

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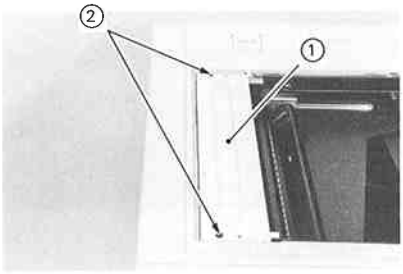
B. Standard White Plate

1. Removing the Standard White Plate

1) Remove the size index plate (vertical).
2) Remove the two screws, and remove the standard white plate.



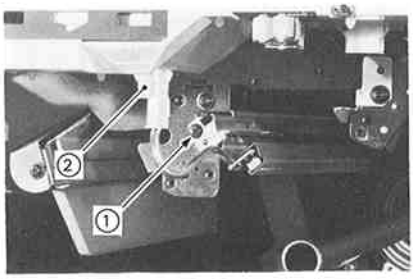
① Standard white plate ② Screws

Figure 4-402

C. Pre-Conditioning Exposure Lamp

1. Removing the Pre-Conditioning Exposure Lamp

1) Open the front doors, and remove the drum cover.
2) Release the feeder unit.
3) Remove the primary and pre-transfer corona units.
4) Remove the drum cleaning unit and drum.
5) Remove the screw.
6) Pull out the connector, and remove the pre-conditioning exposure lamp.



① Screw ② Connector

Figure 4-403

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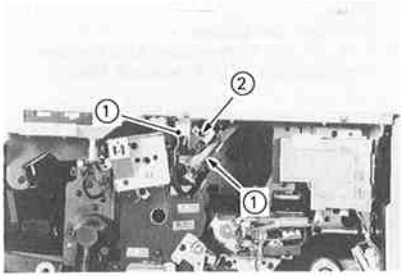
D. Blank Exposure Lamp

1. Removing the Blank Exposure Lamp

1) Open the front doors.
2) Remove the drum cover.
3) Pull out the two connectors.
4) Remove the screw, and pull out the blank exposure lamp.



① Connectors ② Screw

Figure 4-404

2. Adjusting the Position of the Blank Exposure Lamp

1) Set a Test Sheet on the copyboard.
2) Check if the registration is correct on both left and right sides. If not, make adjustments.
3) Select A4/Letter copy paper.
4) Make a single copy in the DIRECT mode.
5) Check the image, and measure the width of the non-image area shown in Figure 4-405.

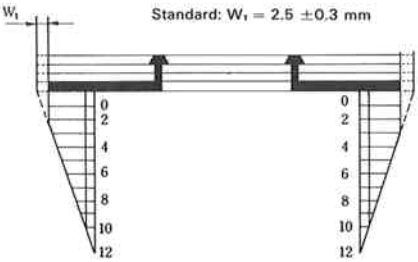
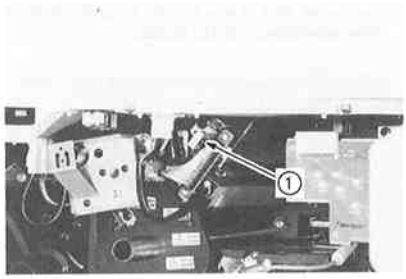


Figure 4-405

6) If the width is out of standard, turn the adjusting screw to adjust the position of the blank exposure lamp.



① Adjusting screw

Figure 4-406

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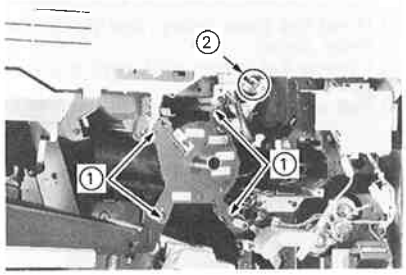
V. CORONA SYSTEM

A. Photosensitive Drum

1. Removing the Drum

1) Open the front doors, and remove the drum cover.
2) Release the feeder unit and lower transfer guide unit.
3) Pull out the primary corona unit.
4) Pull out the pre-transfer corona unit.
5) Remove the drum cleaning unit.
6) Hook the blank exposure unit on the rail mount.
7) Remove the drum centering plate.



① Screws ② Blank exposure lamp hooked here.

Figure 4-500

8) Attach the drum protection sheet on the photosensitive drum.
9) Pull out the photosensitive drum to the front with care.

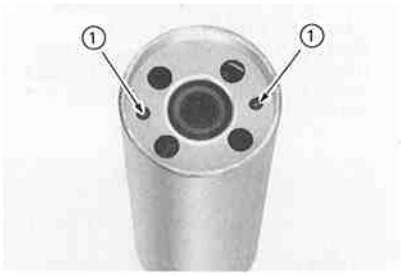
2. Cleaning

If the surface of the photosensitive drum is dirty, wipe it with lint-free paper moistened with alcohol.

1. The use of lint-free paper with foreign matter will damage the photosensitive drum; be sure that he lint-free paper is free of metal or dust particles before cleaning the drum. Never use drum cleaning powder (CK-0429).
2. Do not make copies while the cleaner is released; charging the drum with toner on it can cause insulation damage at points where toner is present.

3. Replacing the Photosensitive Drum/ Drum Heater

1) Remove the photosensitive drum from the copier.
2) Remove the two screws.



① Screws

Figure 4-501

3) Remove the flange on the front side.
4) Remove the drum from the flange at the rear.
5) Remove the connector, and remove the drum heater
   To mount the photosensitive drum, reverse the procedure; however, be sure of the following before the work:

a. The drum surface is free of dirt or scratches.
b. Mount the drum with the label facing the front; otherwise, the density will differ between left and right.

4. Mounting the Photosensitive Drum

1) Attach the drum protection sheet on the new photosensitive drum.
2) Mount the photosensitive drum in the copier.
3) Detach the drum protection sheet from the photosensitive drum.
4) Mount the drum centering plate.
5) Mount the blank exposure lamp and drum cleaning unit.
6) Mount the feeder unit and lower transfer unit.
8) Turn the copier ON.
9) Select 'DRUM_SEL' in the service mode (☒ 3 ☒).
10) Enter the drum sensitivity setting as shown on the sensitivity label that comes with the photosensitive drum.
11) Press the ID and # keys.
12) Check that '_' is indicated for the drum sensitivity on the message display.
13) Press the RESET key twice.
14) Attach the sensitivity label behind the front door (left).
15) Mount all covers and panels.

You must perform image adjustments after leaving the drum heater on for 15 min. or more whenever you have replaced the photosensitive drum.

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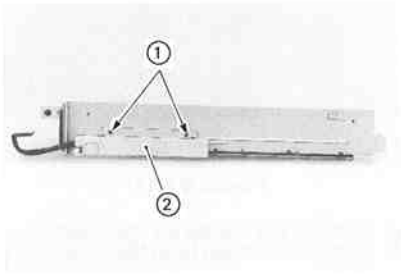
B. Potential Sensor

1. Removing the Potential Sensor

1) Open the front doors.
2) Remove the blank exposure lamp unit.
3) Remove the two screws, and detach the potential sensor from the blank exposure unit.



① Screws ② Potential sensor

Figure 4-502

Note:
The position of the potential sensor does not require adjustment. Replacement of the sensor, however, should always accompany replacement of the potential measuring PCB (make sure that the number on the potential sensor and that on the potential measuring circuit PCB are the same.)

C. Corona Units

1. Outline

The photosensitive drum is surrounded by three corona units; i.e., primary, pre-transfer, and transfer/separation corona units.

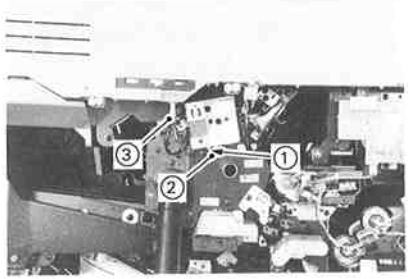
The corona wires are 0.06 mm in diameter and grid wires, 0.1 mm.

The corona wires are gold-plated. Although the grid wires are not gold-plated, those gold-plated may be used for servicing in the field.

2. Primary Corona Unit

a. Removing the Primary Corona Unit

1) Open the front doors, and remove the drum cover.
2) Loosen the screw, and push the fixing plate down.
3) Pull out the connector.



① Screw ③ Connector
② Fixing plate

Figure 4-503

4) Remove the primary corona unit.

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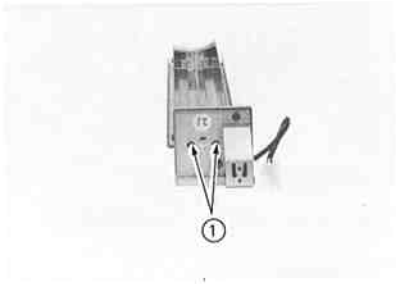
b. Removing the Primary Corona Wire Cleaner

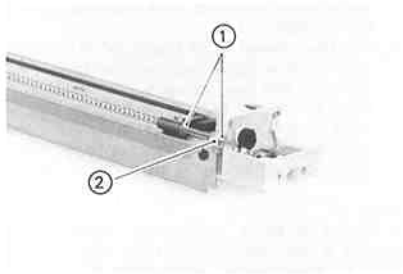
1) Remove the two screws, and remove the motor mount.



① Screws

Figure 4-504

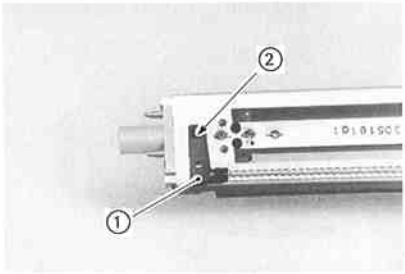
2) Remove the two E-rings, and remove the bushing.



① E-rings ② Bushing

Figure 4-505

3) Remove the screw, and remove the cleaner shaft fixing plate.



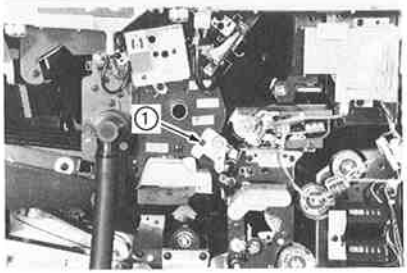
① Cleaner shaft fixing plate ② Screw

Figure 4-506

4) Turn the cleaner shaft, and remove it from the cleaner.
5) Remove the cleaner from the primary corona unit. Open the cleaner with a screwdriver to remove; otherwise, the cleaner pad will get trapped by the primary corona wire, and the pad will peel off.

3. Removing the Pre-Transfer Corona Unit

1) Open the front doors.
2) Remove the drum cover.
3) Remove the screw, and pull out the pre-transfer corona unit.



① Screw

Figure 4-507

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a. Make sure that the blade has not ridden over the roller electrode when the roller electrode is mounted on the pre-transfer corona unit.

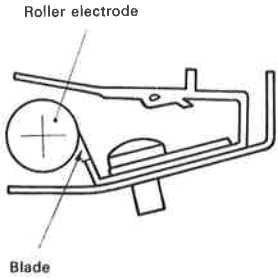
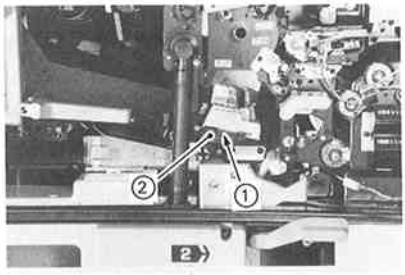


Figure 4-508

4. Removing the Transfer/Separation Corona Unit

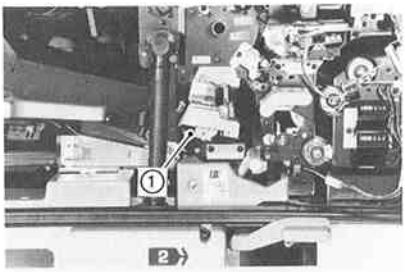
1) Open the front doors, and remove the drum cover.
2) Release the feeder unit.
3) Remove the screw, and remove the corona unit cover.



① Screw ② Corona unit cover

Figure 4-509

4) Pull out the connector, and pull out the transfer/separation corona unit.



① Connector

Figure 4-510

5. Fitting the Corona Wires for the Primary, Pre-Transfer, and Transfer/Separation Corona Units

1) For the primary and transfer corona units, remove the side plate. For the separation corona unit, remove the paper guide.
2) Pry the covers and block of the corona unit with a flat-blade screwdriver, and remove the two covers.
3) Free a length (about 4 cm) of corona wire from the corona wire (0.06 mm in diameter) reel, and form a loop with a diameter of about 2 mm at its end.

Note:
To make a loop, wind the corona wire around a hex key once; turn the hex key three to four times, and twist the corona wire.

4) Cut the twisted end (excess) of the corona wire with a nipper so that it is less than 1 mm.
5) Hook the loop of the corona wire as shown in Figure 4-511, and guide the corona wire into the V-shaped groove of the height adjusting roller.
Hook the corona wire spring on the corona wire, and twist it three to four times.

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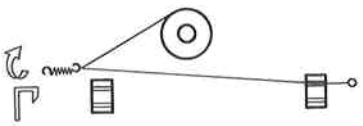
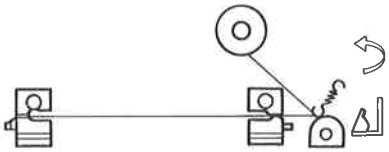
Primary corona unit



Transfer/Separation corona unit



Pre-transfer corona unit

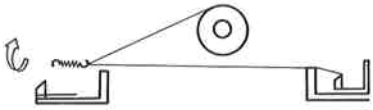
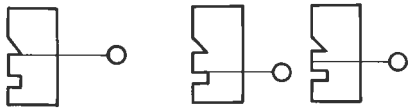


Figure 4-511

6) Cut the excess corona wire to less than 1 mm with a nipper.
7) Pick the end of the corona wire spring with tweezers, and hook it on the charge electrode.

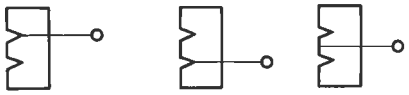
Note:
Make sure of the following:
a. The corona wire is free of breaks or bends and the gold plating has not peeled.
b. The corona wire is free of slacks.
c. The corona wire is fitted in the V-shaped groove of the height adjusting roller.

Transfer/Separation corona unit



Primary corona unit

Grid side

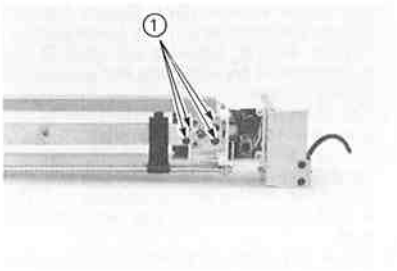


Pre-transfer corona unit

Figure 4-512

6. Fitting the Primary Corona Unit Grid Wire

1) Loosen the four screws.



① Screws

Figure 4-513

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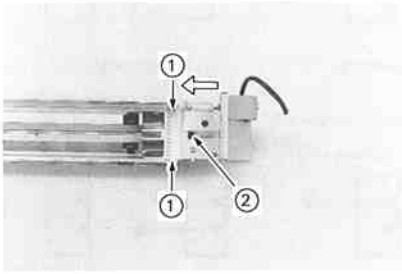
2) Loosen the two screws and tension adjusting screw, move the block (front) into the direction of the arrow shown in Figure 4-514, and loosely tighten the screws.



① Screws ② Adjusting screw

Figure 4-514

3) Free a length of corona wire from the corona wire (0.1 mm in diameter) reel, and form a loop with a diameter of 2 mm at its end.

Note:
To make a loop, wind the corona wire around a hex key once; turn the hex key four to five times, and twist the corona wire.

4) Cut the twisted end (excess) of the corona wire with a nipper so that it is less than 1 mm.
5) Hook the loop on stud A, and lead it in the order shown. (See Figure 4-515.)
6) When the corona wire is arranged as in Figure 4-515, hook it on stud B, and terminate it by winding its end on the fixing screw.
7) Cut the excess of the corona wire with a nipper to less than 1 mm.
8) Loosen the screws loosely tightened in step 1), move the block in the opposite direction of the arrow shown in Figure 4-514, and touch up the tension of the grid.
9) Wipe the grid wire with lint-free paper moistened with low viscosity oil.
10) Make sure of the following:
a. The grid wire is free of breaks or bends, and the gold plating has not peeled.
b. The wire is arranged at equal intervals, i.e., it is in the groove of the block.

7. Fitting the Separation Corona Unit Grid Wire

1) Remove the mounting screw, and remove the corona unit cover from the corona unit.
2) Remove the three mounting screws, and remove the grid wire unit from the corona unit.

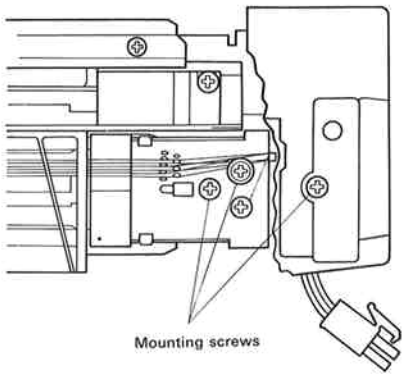


Figure 4-516

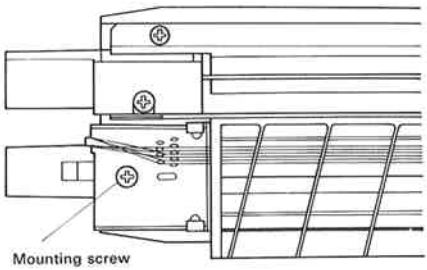


Figure 4-517

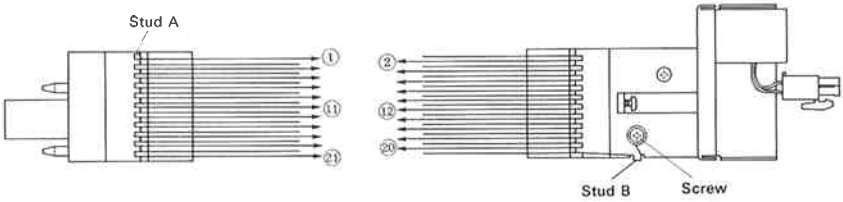


Figure 5-515

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3) Remove the paper guide from the grid wire unit.
4) Free a length (about 5 cm) of corona wire from the corona wire (0.1 mm in diameter) reel, and form a loop with a diameter of about 2 mm at its end.
To make a loop, wind the corona wire around a hex key once; turn the hex key three to four times, and twist the corona wire.
5) Cut the twisted end (excess) of the corona wire with a nipper.
6) Hook the loop on stud A, and lead it in the order shown. (See Figure 4-518.)
7) After the sixth lead, wind it around stud A once. Lead its end between the washer and block (front), and fix it on the fixing screw.
8) Wipe the grid wire with lint-free paper moistened with low viscosity oil.

Note:
Make sure of the following:
a. The grid wire is free of breaks or bends.
b. The grid wire is arranged at equal intervals, i.e., it is in the groove of the block.

9) Mount the paper guide.
10) Mount the grid wire unit on the corona unit, and fix it with two mounting screws.

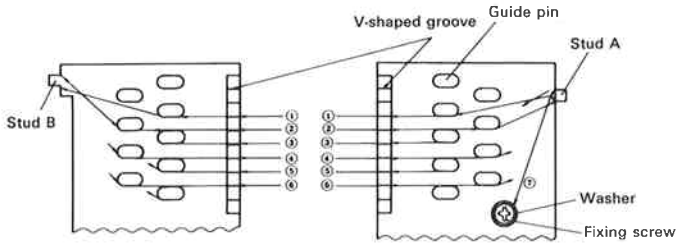

Figure 4-518

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Adjusting the Height of the Corona Wires

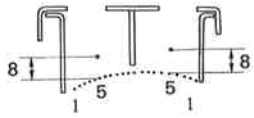
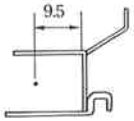
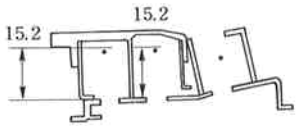
Corona unit	Height of corona wire	Width variable
Primary corona	Value indicated on label. 	±1 mm
Pre-transfer		-
Transfer		±2 mm
Separation		±2 mm

Figure 4-519

Note:
The height (position) of each corona wire can be adjusted by turning the screw behind the corona unit. A single full turn of the screw changes the position of the grid wire by about 0.8 mm.

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VI. DEVELOPING SYSTEM

A. Black Developing Assembly

1. Construction

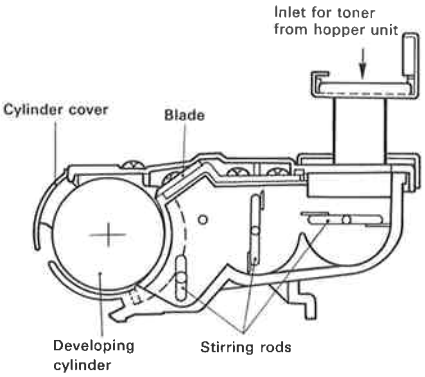
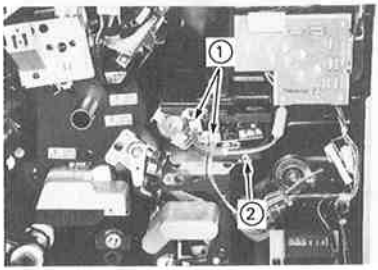


Figure 4-600

2. Removing the Black Developing Assembly

1) Turn the copier OFF.
2) Open the front doors.
3) Remove the drum cover.
4) Pull out the two connectors, and remove the screw.



① Connectors ② Screw

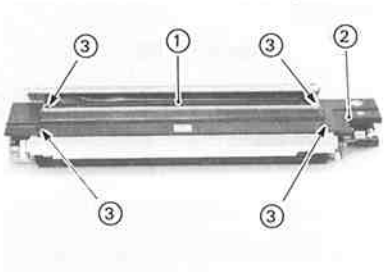
Figure 4-601

4) Pull the black developing assembly out to the front with care, and remove the black developing assembly while supporting it on its bottom.

> Be sure to hold the developing assembly at its edge, and never hold it as if to hold the developing cylinder. Otherwise, the toner between the blade and the developing cylinder may cake up.

3. Removing the Blade, Developing Cylinder, and Side Seal

1) Remove the black developing assembly from the copier.
2) Remove the four screws, and remove the upper cover.



① Toner inlet ③ Screw
② Upper cover

Figure 4-602

3) Empty the developing assembly of its toner on a newspaper or waste paper.
4) Open the cylinder cover.

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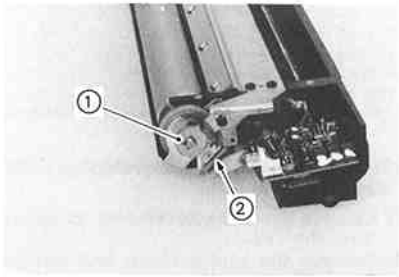
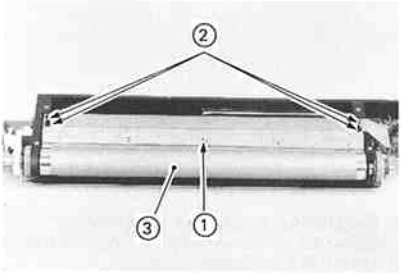
5) Mark the polarity positioning plate with a scriber.
6) Remove the screw, and remove the polarity positioning plate and spring.



① Polarity positioning plate ② Spring

Figure 4-603

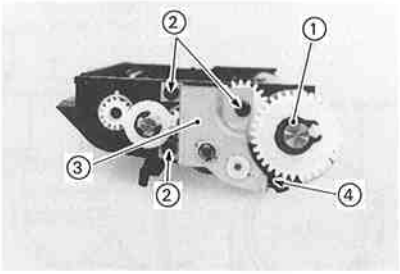
7) Remove the four screws, and remove the blade mount. Take care not to damage the developing cylinder by the blade.



① Blade ③ Developing cylinder
② Screws (M3 × 6)

Figure 4-604

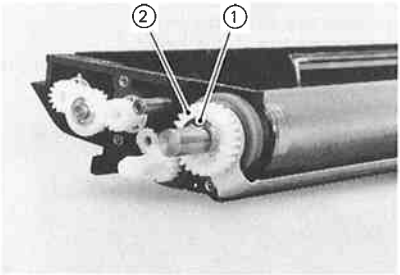
8) Remove the grip ring, and remove the gear. Take care; the pin will fall at the time.
9) Remove the four screws, and remove the spring mount.



① Grip ring ③ Spring mount
② Screws ④ Screw (M3 × 4)

Figure 4-605

10) Remove the E-ring, and remove the gear. Take care; the pin will fall at the time.



① E-ring ② Gear

Figure 4-606

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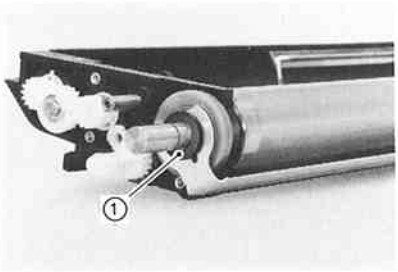
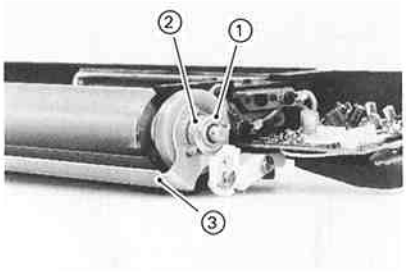
11) Remove the bushing.



① Bushing

Figure 4-607

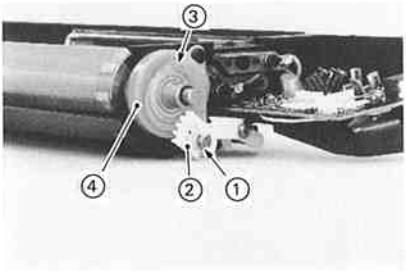
12) Remove the grip ring, and remove the shutter gear and cylinder cover.



① Grip ring
② Shutter gear
③ Cylinder cover

Figure 4-608

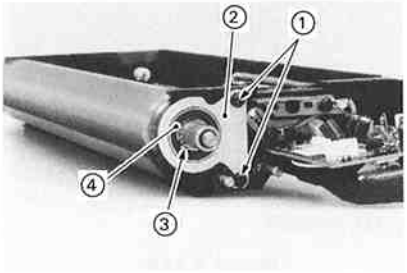
13) Remove the E-ring, and remove the gear, plastic sheet, and developing assembly roller.



① Grip ring
② Gear
③ Plastic sheet
④ Developing assembly roller

Figure 4-609

14) Remove the two screws, and remove the ball bearing fixing plate.
15) Remove the C-ring, and remove the ball bearing.



① Screw
② Ball bearing fixing plate
③ C-ring
④ Ball bearing

Figure 4-610

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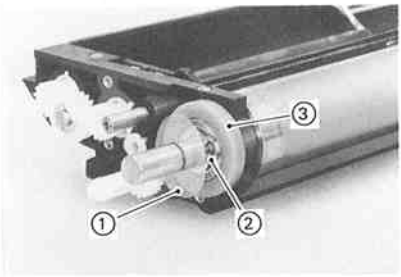
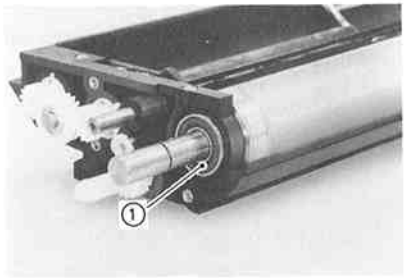
16) Remove the plastic sheet, grip ring, and remove the developing assembly roller and washer.



① Plastic sheet
② Grip ring
③ Developing assembly roller

Figure 4-611

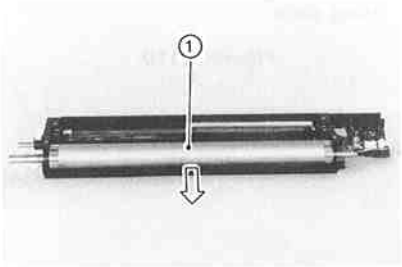
17) Remove the ball bearing.



① Ball bearing

Figure 4-612

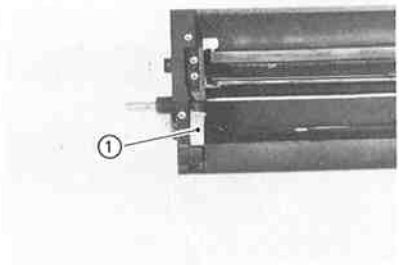
18) Remove the developing cylinder.



① Developing cylinder

Figure 4-613

19) Detach the side seal.



① Side seal

Figure 4-614

4. Attaching the Side Seal and Mounting the Blade

1) Insert the inner seal into the side seal.

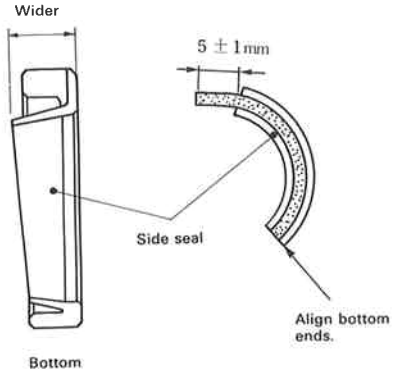


Figure 4-615

2) Attach the side seal on the developing assembly.
3) Adjust the thickness with a thickness gauge (CK-0057) so that it is 0.24 mm.

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4) Mount all parts except the blade on the developing assembly. In mounting the cylinder cover, make sure that the gears are engaged over the O marking.

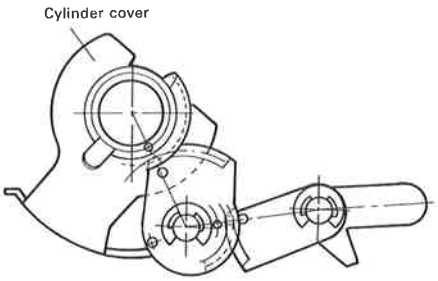

Figure 4-616

5) Place the gap gauge under the side seal

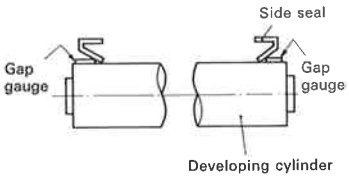

Figure 4-617

6) Place the blade on the gap gauge, and mount the blade so that the inner seal will bend upward over the blade.

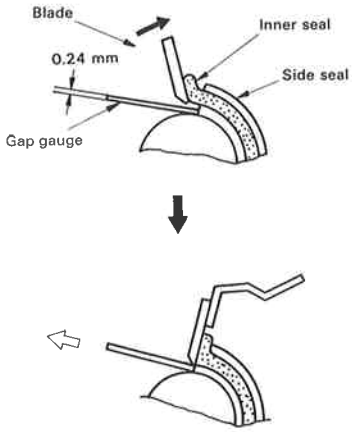

Figure 4-618

B. CD Unit

1. Replacing the Developer

Tools
1 Carrier replacing plate (TKN-0476-000)
2 Knob (FA4-1047-000)

Steps
1) Remove the screw, and remove the collar and spring; then, detach the developing cylinder cover.
2) Remove the four screws, and detach the splash blocking cover.

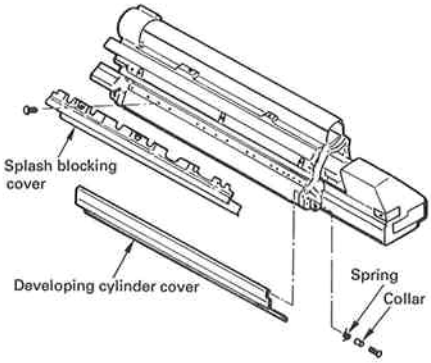

Figure 4-619

3) Remove the screw from the bottom of the CD unit, and detach the leaf spring (both front and rear).
4) Put paper over the developing cylinder to protect it from damage.
5) Engage the hook of the carrier replacing plate as shown in the figures.

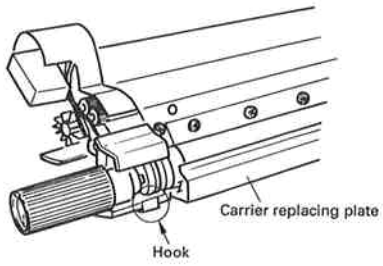

Figure 4-620

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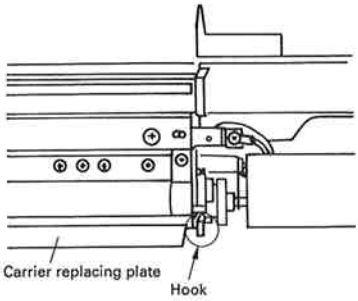

Figure 4-621

6) Using the screw hole used to hold the leaf spring mentioned in step 3), fix the carrier placing tool in place.

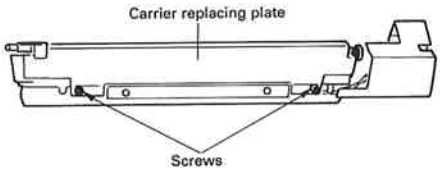

Figure 4-622 CD Unit (bottom view)

7) Remove the paper from the developing cylinder.
8) Remove the three screws, and detach the CD unit top cover.

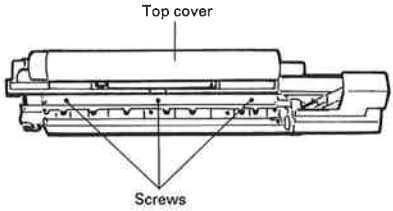

Figure 4-623

9) Place waste paper (newspaper) on the floor, and empty the CD unit of developer.

10) Remove the grip ring, and remove the drive gear from the developing cylinder; in its place, put the grip into the shaft of the developing cylinder.

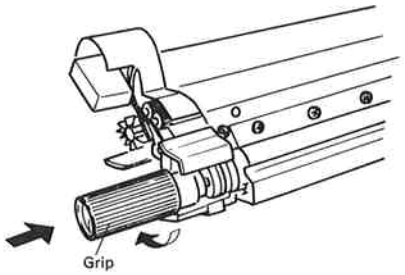

Figure 4-624

11) Turn the grip clockwise to remove the developer from around the developing cylinder.
12) Turn over the CD unit, and tap lightly on its bottom to draw out the developer.
13) Turn the grip clockwise once again to remove the developer from around the developing cylinder.
14) Then, detach the grip and carrier replacing plate.
15) Attach the parts you have detached back on the CD unit.
16) A small amount of developer (20 to 30 g) remains in the CD unit; dispose of an equivalent amount (5 to 100 mm in height) from the starter container.
17) Perform color density adjustment according to the instructions given for the CD unit.

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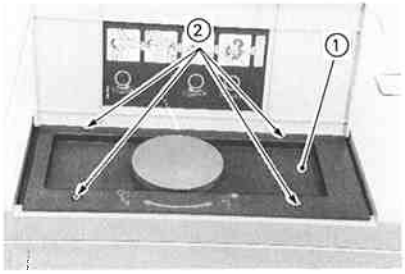
C. Hopper Unit

1. Removing the Hopper Unit

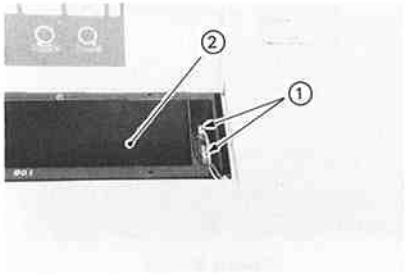
1) Remove the developing assembly from the copier.
2) Open the hopper cover.
3) Remove the four screws, and remove the hopper upper cover.



① Hopper upper cover ② Screws

Figure 4-625

4) Remove the two connectors, and remove the hopper unit from the copier.



① Connectors ② Hopper unit

Figure 4-626

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VII. CLEANING SYSTEM

A. Drum Cleaning Unit

1. Construction

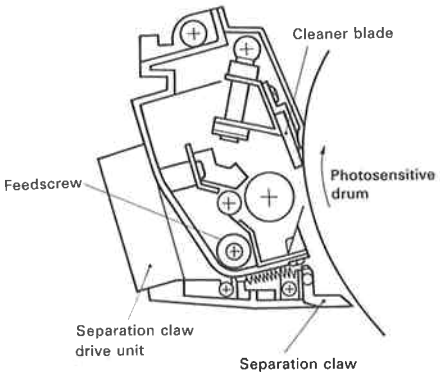
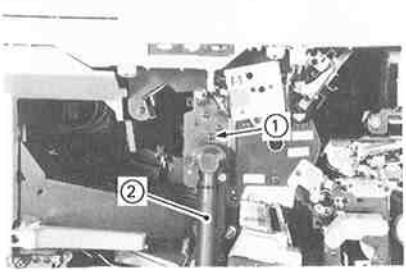


Figure 4-700

2. Removing the Drum Cleaning Unit

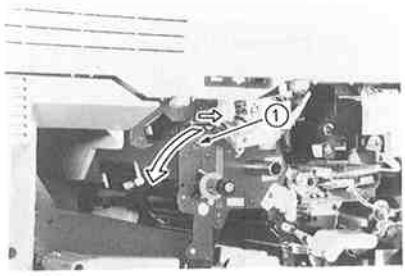
1) Open the front doors, and remove the drum cover.
2) Release the feeder unit.
3) Remove the screw, and remove the waste toner tube.



① Screw ② Waste toner tube

Figure 4-701

4) Pull the toner shutter to the front to cover the waste toner inlet.
5) Remove the screw.
6) Hold the handle of the cleaning unit, and pull the cleaning unit out to the front so that the cleaning unit support spindle moves in the direction of the arrow in Figure 4-702.



① Screw

Figure 4-702

7) Hold the handle, and pull the cleaning unit to the front and out.

Figure 4-703

Note:
The cleaning unit is not provided with a stopper. Take care not to drop it when pulling it out.

To mount the cleaning unit on the copier, reverse the procedure. Make sure of the following for the work.

a. The separation claw is fitted correctly.
b. When bringing the cleaning unit into contact with the drum, push the rear side of the cleaning unit with your hand. Holding the cleaning unit on its bottom at this time can damage the drum by the separation claw.

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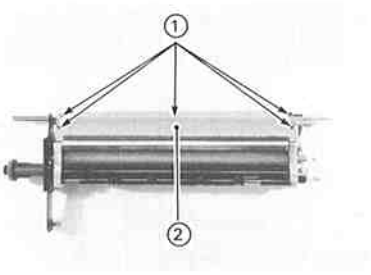
3. Removing the Cleaning Blade

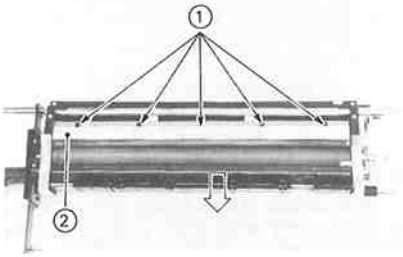
1) Remove the cleaning unit from the copier.
2) Remove the five screws, and remove the upper cover of the cleaning unit.



① Screws ② Upper cover

Figure 4-704

3) Loosen the five screws, and pull the cleaning blade down and out.



① Screws ② Cleaning blade

Figure 4-705

4. Mounting the Cleaning Blade

To mount the cleaning blade, reverse the procedure. Push in the cleaning blade as far as it goes, and fix it while it is butted against the rear of the cleaning blade mount.

After mounting the cleaning blade, check that the edge of the blade is not exceedingly bent.

Further, move the cleaning blade to make sure that its end is not in contact with the side plate.

The cleaning blade of the copier can be used for either of its edges (ⓐ and ⓑ of Figure 4-706).

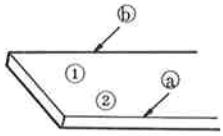
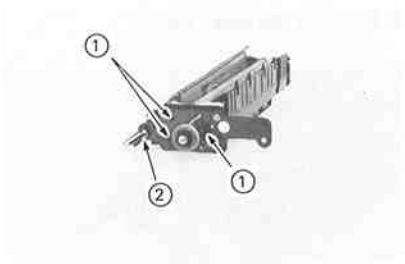


Figure 4-706

5. Removing the Magnet Roller

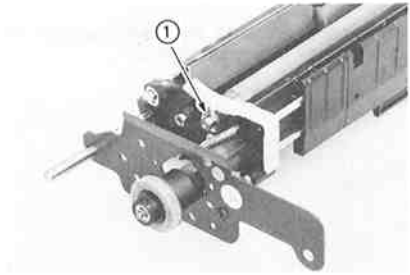
1) Remove the upper cover from the cleaning unit.
2) Remove the three screws and E-ring, and remove the side plate (front).



① Screws ② E-ring

Figure 4-707

3) Remove the E-ring.



① E-ring

Figure 4-708

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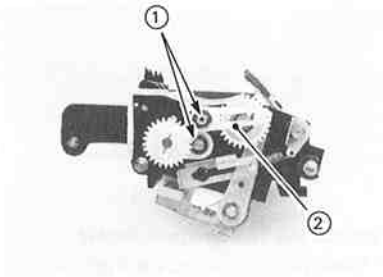
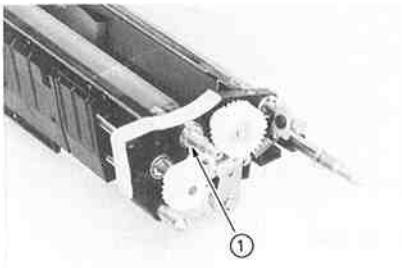
4) Remove the two E-rings, and remove the washer, lever, and spring.



① E-rings ② Lever

Figure 4-709

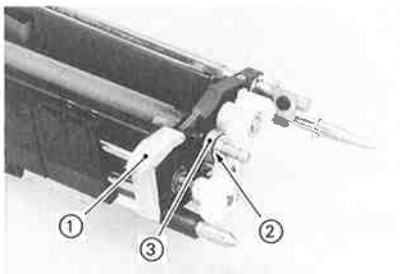
5) Remove the grip ring.



① Grip ring

Figure 4-710

6) Detach the side seal, and remove the ball bearing and oil ring.



① Side seal ③ Ball bearing
② Oil ring

Figure 4-711

7) Remove the magnet roller

6. Mounting the Side Seal

1) Detach the old side seal from the cleaning unit.
2) Clean the glue left by the side seal with alcohol.
3) Peel the sheet off the side seal, and attach the side seal on the cleaning unit aligning it with the reference line.

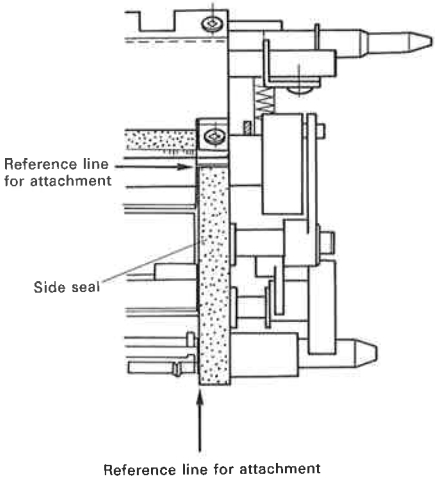
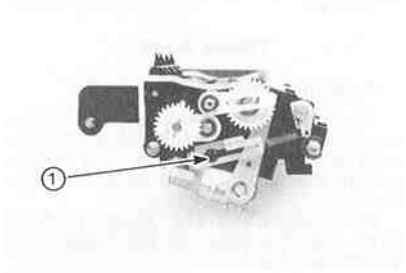


Figure 4-712

7. Screws Not Meant for Removal

The screws shown below are positioned at the factory with high precision. Never loosen or remove them in the field.



① Screw

Figure 4-713

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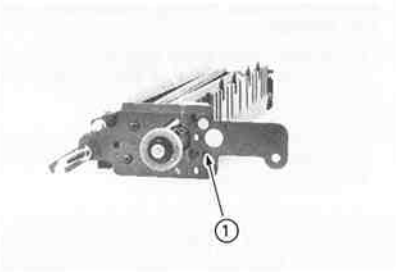


① Screw

Figure 4-714

B. Separation Claw Drive Unit

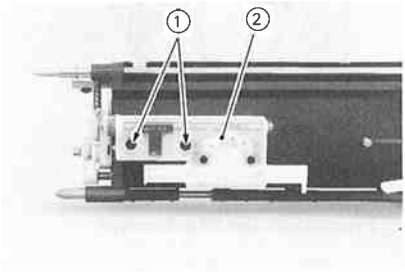
1. Outline

The separation claw is located very close to the drum, and it can damage the drum if kept fixed in position. The separation claw, for this reason, is made to move back and forth over a distance of 50 mm in parallel with the drum.

2. Removing the Separation Claw Drive Unit from the Cleaning Unit

1) Remove the cleaning unit from the copier.
2) Remove the two screws, and remove the separation claw drive unit.

Note:
Take care not to break the separation claw.



① Screws

② Separation claw drive unit

Figure 4-715

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VIII. FIXING SYSTEM

A. Fixing Assembly

1. Construction

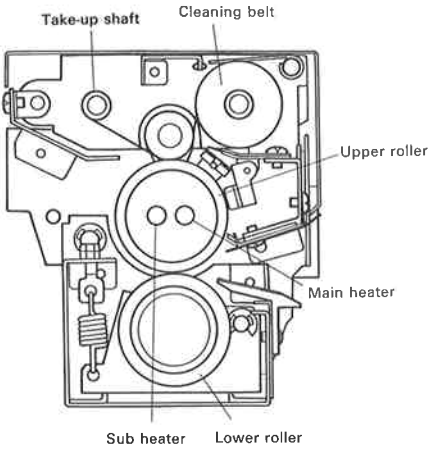


Figure 4-800

2. Pressurization Mechanism

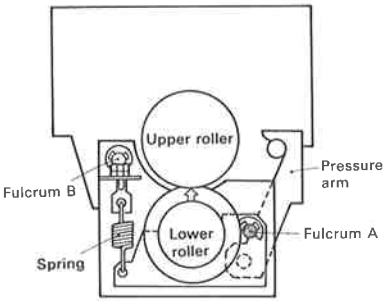
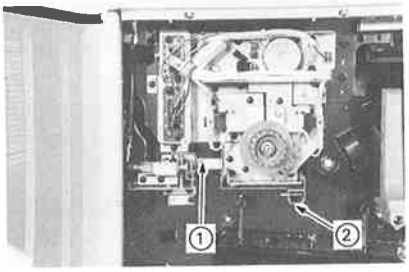


Figure 4-801

- When the pressure arm is set, pressure is applied to the upper and lower roller units with fulcrum B at its center.
- The force of the spring pushes the lower roller against the upper roller with fulcrum A at its center.

3. Removing the Fixing Assembly from the Copier

1) Open the front doors and paper delivery unit, and remove the fixing assembly cover.
2) Remove the screw.
3) Release the fixing assembly stopper, hold the handle, and pull the fixing assembly to the front.



① Screw ② Fixing assembly stopper

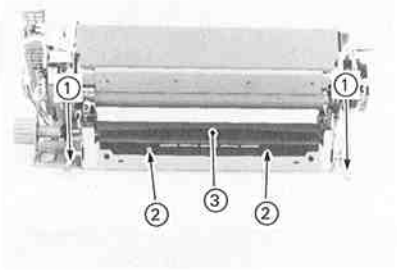
Figure 4-802

4) Lift the fixing assembly with both hands, and take it out of the copier.

Note:
When mounting the fixing assembly back onto the copier, be sure to fit the screw shown in Figure 4-802.

4. Removing the Lower Roller

1) Remove the fixing assembly from the copier.
2) Remove the two screws, and remove the handle from the fixing assembly.
3) Pull and release the pressure levers, and open the upper roller unit
4) Remove the two screws, and remove the paper guide.



① Pressure levers ③ Paper guide
② Screws

Figure 4-803

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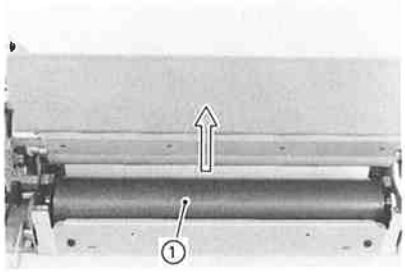
5) Remove the lower roller, and remove the two bearings.

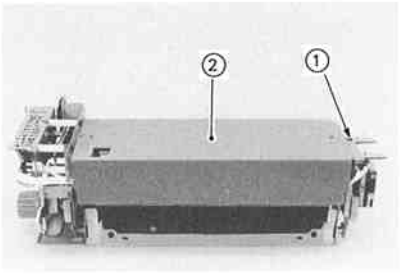


① Lower roller

Figure 4-804

5. Removing the Upper Roller

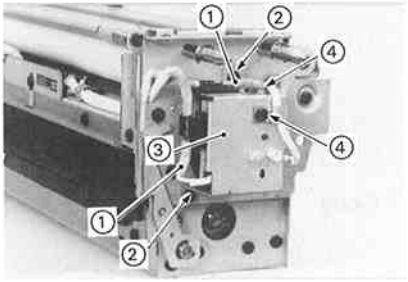
1) Remove the fixing assembly from the copier.
2) Remove the screw, and remove the upper cover of the fixing assembly.



① Screw
② Upper cover of fixing assembly

Figure 4-805

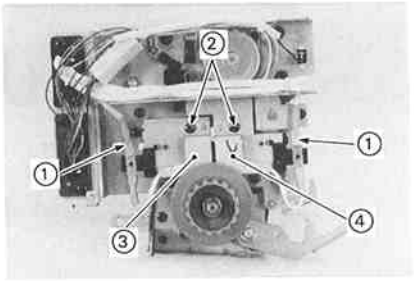
3) Remove the two screws, and remove the handle from the fixing assembly.
4) Pull the pressure lever to release the pressure.
5) Remove the two harness stoppers.
6) Remove the two fastons and two screws, and remove the heater mount.



① Fastons
② Screws
③ Heater mount
④ Harness stopper

Figure 4-806

7) Remove the two fastons.
8) Remove the four screws, and remove the two heater terminal mounting plates and two heaters.



① Fastons
② Screws
③ Heater terminal mounting plate (sub heater)
④ Heater terminal mounting plate (main heater)

Figure 4-807

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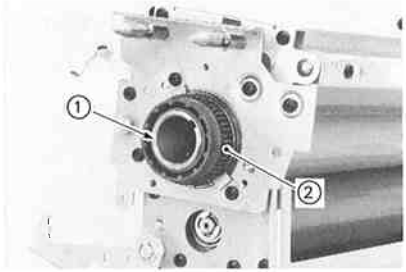
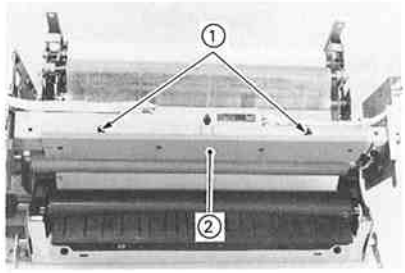
9) Remove the C-ring, and pull out the gear.



① C-ring ② Gear

Figure 4-808

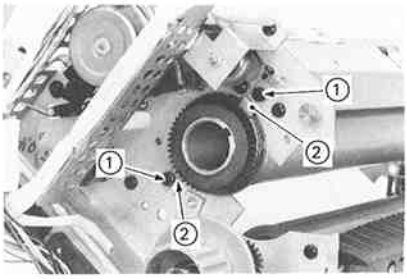
10) Open the fixing assembly cleaning unit.
11) Remove the two screws, and remove the upper paper guide plate.



① Screws ② Upper paper guide plate

Figure 4-809

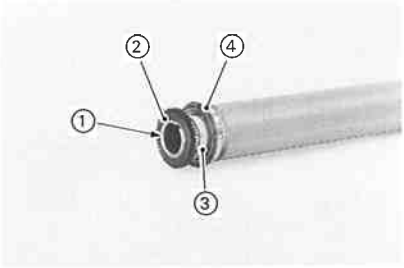
12) Remove the two screws, and remove the bearing fixing plate.



① Screws ② Bearing fixing plate

Figure 4-810

13) Remove the upper roller.
14) Remove the C-ring, and remove the gear, insulation bushing, and ball bearing.



① C-ring
② Gear
③ Insulation bushing
④ Ball bearing

Figure 4-811

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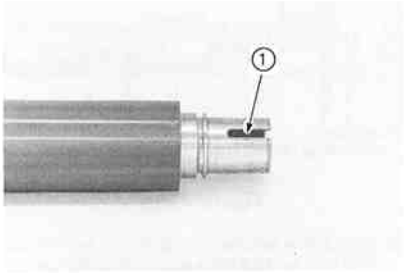
6. Mounting the Heater and Upper Roller

To mount the heater and upper roller, reverse the procedure for removing them. Make sure of the following for the work:

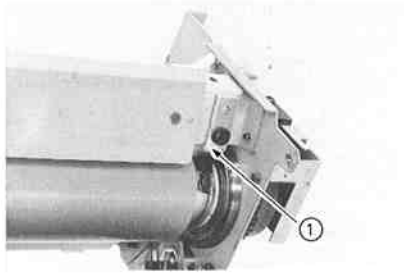
a. Heater.
   Do not touch the surface directly with hands.
b. Upper roller.
   Wrap the roller in copy paper or the like so as to avoid soiling or damaging its surface.
c. Mount the upper roller so that the end with the groove shown in Figure 4-812 is to the rear.



① Groove

Figure 4-812

d. When the upper roller is mounted, make sure that the anti-static brush is in contact with the end of the roller as shown in Figure 4-813.

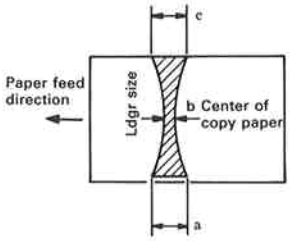


① Anti-static brush

Figure 4-813

7. Adjusting the Nip (tightening the pressure adjusting nut)

The nip width is proper if within the dimension indicated in Table 4-800. Otherwise, adjust the nip using the pressure adjusting nut.



Note:
a and c are lengths 10 mm from sides of copy paper.

Figure 4-814

Length	Measured when upper and lower rollers are sufficiently heated
b	6.5 ±0.5 mm
|a – c|	0.5 mm or less

Table 4-800

a. Measuring the Nip Width
   If the roller is cool when measuring the nip, wait for 15 minutes after the WAIT indicator turns green. Take measurements after making 20 copies.

b. Procedure
   1) Open the copyboard cover, and make a solid black copy in ledger size.
   2) Turn the power switch OFF as soon as the leading edge of the copy paper comes out into the copy tray, and open the front doors and delivery unit.
   3) Turn the fixing assembly knob slightly counterclockwise. Keep it there for 15 seconds and, thereafter, turn it to remove the copy paper from the fixing assembly.
   4) Measure the section shown in Figure 4-814. The toner on the section should be shiny.

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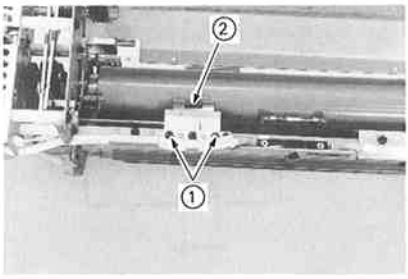
8. Removing the Thermistor

1) Remove the fixing assembly.
2) Open the fixing assembly cleaning unit.
3) Remove the two screws, and remove the thermistor cleaning unit.



① Screws ② Thermistor cleaning unit

Figure 4-815

9. Attaching the Thermistor

1) Put a mark on the harness of the thermistor as shown.

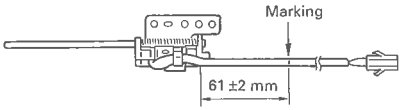


Figure 4-816

2) Attach the thermistor to the fixing assembly

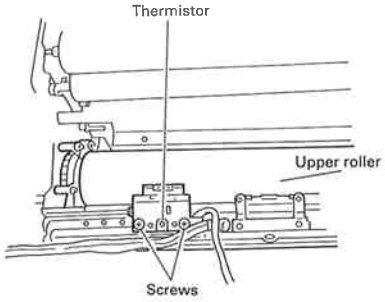


Figure 4-817

3) Move the thermistor reciprocating cam to move the thermistor as much as possible to the front (left of the figure).

Make sure that the thermistor is fully moved to the front; if the harness is fixed without moving the reciprocating shaft, the thermistor can lift when the shaft moves to the front.

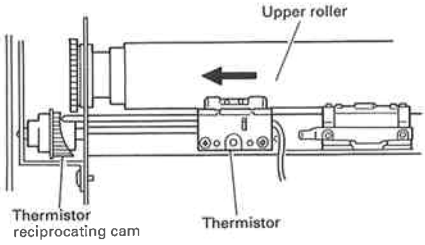


Figure 4-818

4) Match the lead wire retainer and the point marked on the harness of the thermistor; then, fix it in place using a screw.

Caution:

Make sure that the harness is not broken or twisted.

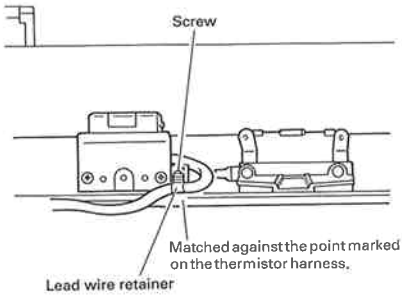


Figure 4-819

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5) Insert the faston into the fuse unit.
6) While holding the harness as shown in Figure 4-820, attach the cord clamp (small) to prevent interference between the cleaning belt and harness.

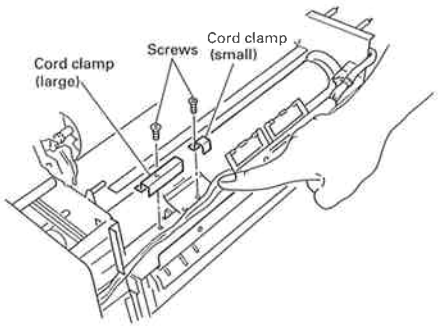

Figure 4-820

8) Make sure that the reciprocating shaft butts against the thermistor reciprocating cam.
9) Move it back and forth more than once to make sure that the thermistor does not lift.
10) Make sure that the detecting face of the thermistor is in even contact with the surface of the upper roller.

Reference:

You need not adjust the position of the thermistor; if the contact is not even, check to make sure that the torsion spring is correctly mounted.

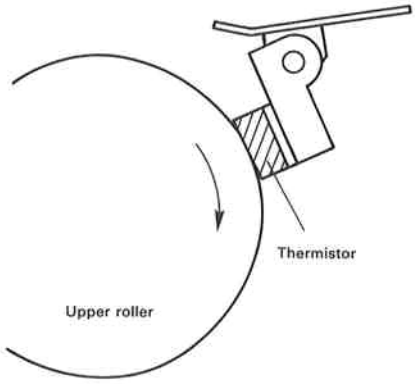

Figure 4-821

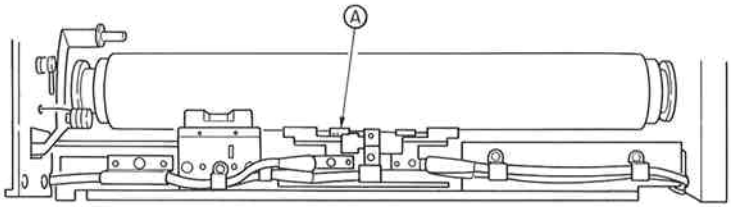

Figure 4-822

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10. Position of the Thermal Fuse

Use a fuse rated for 192° C. Adjust the position of the thermal fuse using the thermal fuse A shown in Figure 4-822.

Attach the thermal fuse A so that it is 4.5±0.5 mm from the upper roller.

Caution:

Be sure to use the spring washer and the screw to fix the thermal fuse in place.

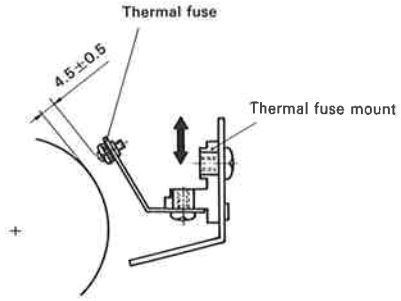

Figure 4-823

11. Position of the Paper Guide

The position of the paper guide is adjusted by the paper guide mount. As such, the paper guide can be mounted without adjusting its position.

Note:

The position of the paper guide will have to be adjusted if the paper guide mount is removed. Do not loosen the screws holding the paper guide mount. If they need to be loosened for some reason, be sure to mark the position with a scriber.

Note:

To adjust the position of the paper guide, place the fixing assembly on a desk, and adjust the position by moving the paper guide mount until it is 56.5 ±0.5 mm away from the desk as shown in Figure 4-824.

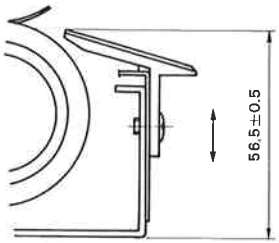

Figure 4-824

12. Lubrication

Apply heat resisting grease (CK-0427) on the following:

a. Sections at which gears engage (rear)
b. Gears on the knob

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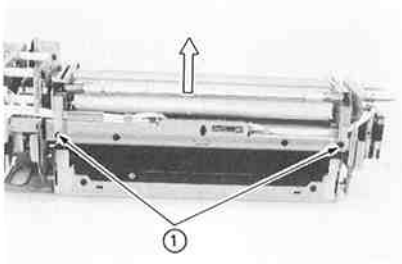
B. Fixing Assembly Cleaning Unit

1. Outline

The fixing assembly cleaning unit consists of a cleaning belt impregnated with silicone oil. The belt is kept in contact with the upper roller for cleaning the dirt on the upper roller surface.

2. Removing the Cleaning Belt

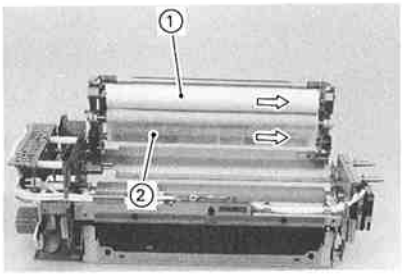
1) Remove the fixing assembly from the copier.
2) Remove the screw, and remove the fixing assembly upper cover. (See Figure 4-805.)
3) Remove the two screws, and open the fixing assembly cleaning unit.



① Screws

Figure 4-825

4) While opening the cleaning belt stopper plate, push the feeder rod toward the rear of the fixing assembly, and remove the rod.
5) Push the take-up shaft toward the rear of the fixing assembly, and remove the take-up shaft. (Take care not to damage the belt detection lever.)



① Feeder rod ② Take-up shaft

Figure 4-826

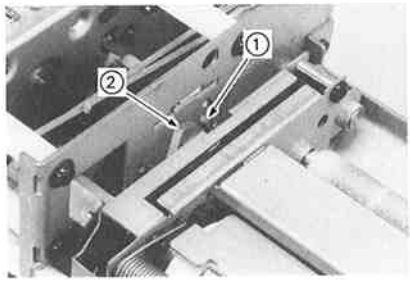
3. Mounting the Cleaning Belt

The feeder rod, take-up shaft, and cleaning belt are designed as a single entity. To mount the cleaning belt, reverse the procedure for its removal with the following in mind.

a. Mount the cleaning belt after winding the belt two to three times around the take-up shaft. At the time, check that the belt is impregnated with oil.

> Check that the belt is properly wound without slants, slacks, or wrinkles.

b. After mounting the belt, make sure that the belt detection lever is above the cam.



① Detection lever ② Cam

Figure 4-827

c. Check that the belt detection lever is in contact with the belt.

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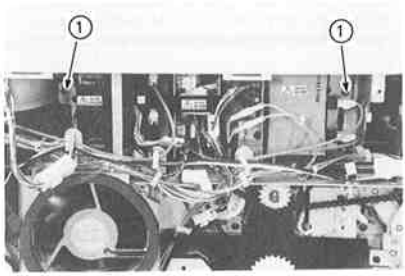
IX. ELECTRICAL

A. High-Voltage Transformer Unit

1. Removing the High-Voltage Transformer

1) Remove the rear panel.
2) Remove all connectors connected to the high-voltage transformer.
3) Remove the two screws, and remove the high-voltage transformer unit.



① Screws

Figure 4-900

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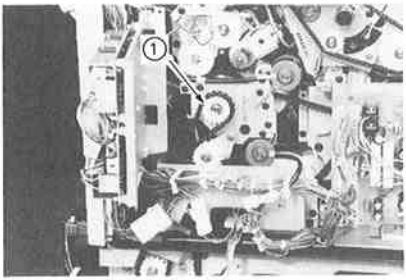
X. PAPER DECK UNIT

1. Removing the Paper Deck Unit

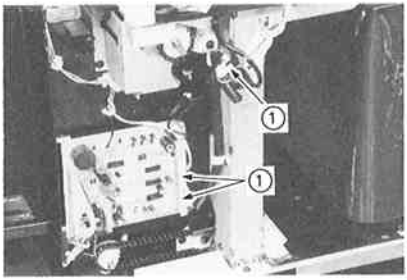
1) Remove the covers and door of the paper deck unit.
2) Remove the rear panel of the copier, and open the motor driver PCB.
3) Detach the chain.



① Chain

Figure 4-1000

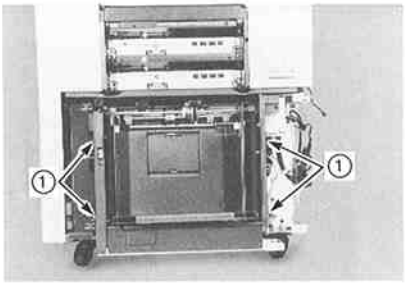
4) Pull out the three connectors.



① Connectors

Figure 4-1001

5) Remove the four screws, and remove the paper deck unit.

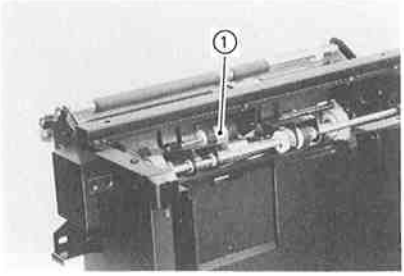


① Screws

Figure 4-1002

2. Removing the Feeder Roller

1) Remove the retaining ring.
2) Keep the separation roller down with a hand, and remove the feeder roller.



① Feeder roller

Figure 4-1003

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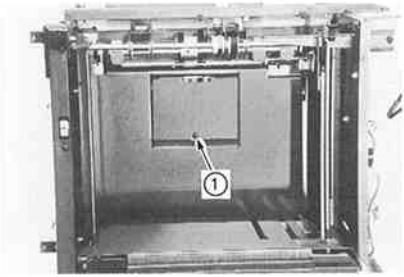
3. Removing the Separation Roller

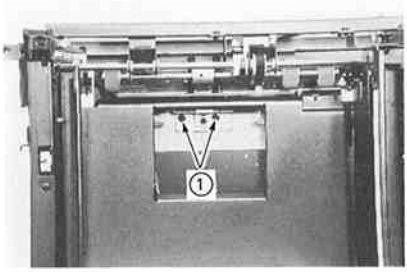
1) Remove the screw, and remove the blanking plate.



① Screw

Figure 4-1004

2) Remove the two screws, and remove the separation roller unit.



① Screws

Figure 4-1005

Note:
In mounting the separation roller unit, keep it fully to the right.

4. Position of the Paper Pick-Up Roller

a. For Letter Size

Figure 4-1006

5. Position of the Door Switch

Adjust the microswitch mount so that the microswitch (PMS2) is actuated when the paper deck door is closed.

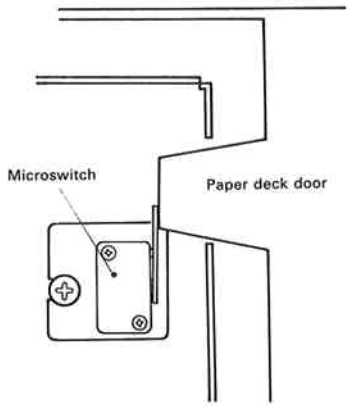


Figure 4-1007

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6. Position of the Lifter Position Sensor (PI2)

1) Open the paper cover, and set a sheet of copy paper on the lifter.
2) Insert the door switch actuator (TKN-0093) into the door switch unit.
3) Adjust the position detection sensor mount so that the lifter and the paper pick-up drive shaft is 13 $+1, -0.5$ mm away when the lifter stops moving up.

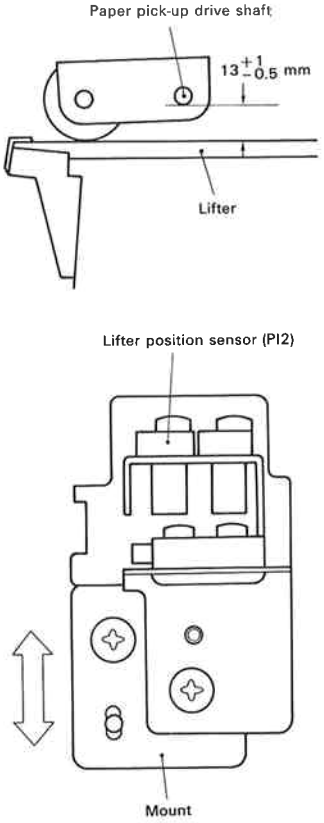

Figure 4-1008

7. Position of the Upper Limiter Switch (PMS4)

1) Adjust the lifter position sensor (PI2).
2) Adjust the upper limiter switch mount by moving it to the left and right so that the upper limiter switch is actuated when the sensor arm is lifted by hand to its limit.

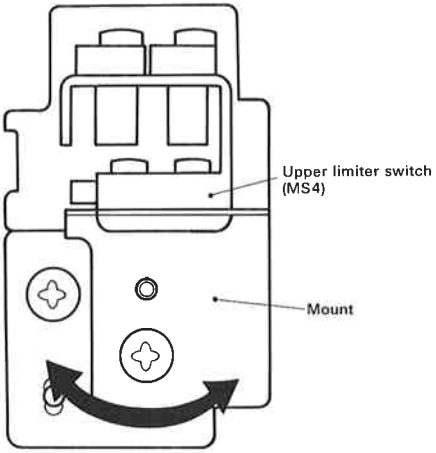

Figure 4-1009

8. Position of the Retaining Solenoid

Adjust the position of the retaining solenoid so that the gap between the brake plate and stopper claw is 1.5 $\pm$0.5 mm when the stopper claw is pushed by a finger.

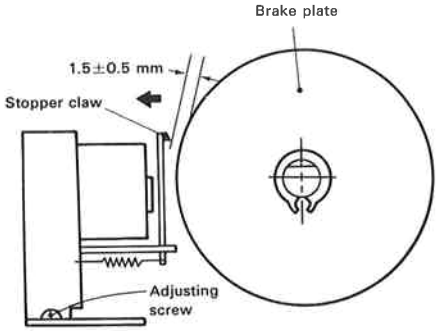

Figure 4-1010

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9. Position of the Clutch Plate

Mount the clutch plate so that the paper pick-up drive shaft is centered over its hole.

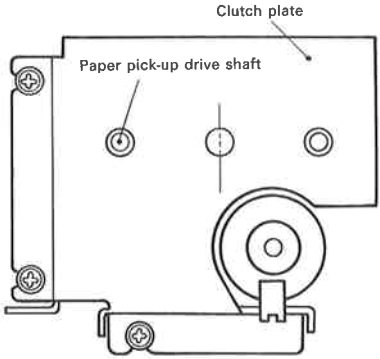

Figure 4-1011

10. Position of the Sprocket

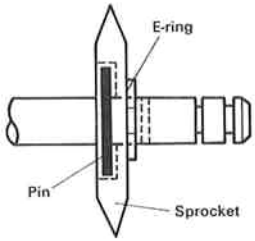

Figure 4-1012

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CHAPTER 5

INSTALLATION

The copier is carefully adjusted and strictly inspected before it leaves the factory. Proper installation of the copier is very important in maintaining its out-of-factory performance.

Make sure that all the conditions discussed in this chapter are satisfied before installation, and carry out all necessary inspections after installation.

I. SELECTION OF LOCATION 5-1
II. UNPACKING AND INSTALLATION 5-3
III. RELOCATION OF COPIER 5-7
IV. INSTALLATION OF CD UNIT ... 5-8
V. INSTALLATION OF CONTROL COUNTER II AND CONTROL CARD III SOCKET 5-10
VI. INSTALLATION OF CONTROL CARD V 5-11

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I. SELECTION OF LOCATION

The location of the copier should be chosen based on the following considertions.

If possible, visit the user and study the site before delivery of the copier.

1. An AC power outlet that can be used exclusively for the copier and capable of providing the rated voltage should be available.
2. The ambient temperature should be between 7.5°C and 32.5°C and the humidity, 10% to 85%. Avoid locations near water faucets, humidifiers, water boilers, and refrigerators.
3. Avoid locations near open fire or subject to dust or ammonia fumes and direct rays of the sun. Provide curtains over the windows if necessary.
4. The floor should be level so that none of the feet of the copier is off the floor.
5. Allow at least 10 cm from any wall to provide access.

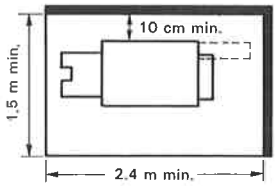

Figure 5-1

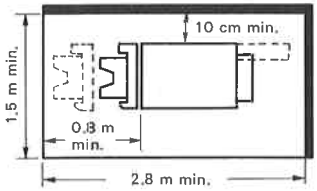

Figure 5-2 Sorter 25 I

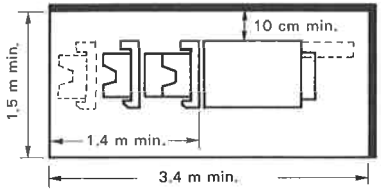

Figure 5-3 Sorters 25 I and II

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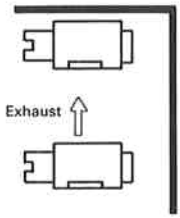
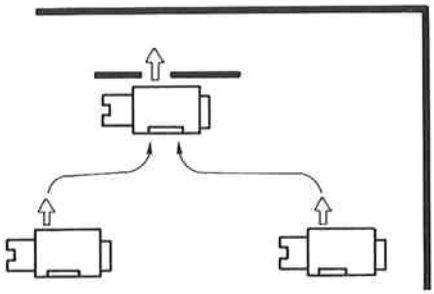
6. Choose a well-ventilated location. The copier should be kept free of direct exhaust from other copiers or machines and from holes of the room used for ventilation.
   Exhaust from copiers usually contains silicone gas from evaporating silicone oil in the fixing assembly. The gas soils the corona wires and can shorter the service life of the wires. This is particularly noticeable in low humidity conditions.



Wrong

Figure 5-4



Wrong

Figure 5-5

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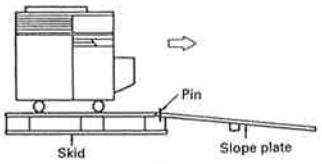
II. UNPACKING AND INSTALLATION

When a piece of metal is moved from a cold place to a warm place, droplets of water form on its surface. This phenomenon is known as condensation. Condensation affects the performance of machines. The simplest way to eliminate condensation from the copier, any machines for that matter, is to leave it alone until it warms to room temperature (at least one hour).

Step	Procedure	Check	Remarks
1	Unpack the copier		
2	Lift the delivery side of the copier, and remove the two pads.		The copier weighs 170 kg (190 kg if with feeder); work in a group of two.
3	Lift the paper deck side of the copier, and remove the two pads.		The copier weighs 170 kg (190 kg if with feeder; work in a group of two.
4	Detach the two slope plates stored in the center of the skid.		
5	Turn over the slope plates, and insert the pins through the holes of the skids and the slope plates; you will find the pins in the cardboard box attached to the bottom pad. Move the copier slowly along the slopes.		
6	Open the cardboard box, and take out parts and materials.	Make sure the following are available: ● Drum ● Copy tray ● Trimming index (NP-6650) ● Operator's Manual ● Manual pocket ● Toner ● Cassettes	
7	Open the delivery unit, and remove the upper left panel.		
8	Remove the plate fixing the scanner in place.		See Figure 5-6.
9	Open the front doors.		
10	Remove the CD unit.	Check the developing cylinder for dirt and damage.	NP-6650 only.
11	Remove the fixing assembly cover and drum cover.		
12	Remove the screw, and pull out the fixing assembly.		
13	Remove the fixing screw, and remove the pressure lever at front and rear of the fixing assembly; and push in the pressure lever.	Check that the fixing roller is held under pressure.	The pressure lever is designed to apply pressure in 2 steps; the pressure is weakened for transit. See Figure 5-7.
14	Mount the fixing assembly, and screw it in place.		
15	Release the feeder unit.		
16	Remove the cleaning unit.		

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Step	Procedure	Check	Remarks
17	Remove the primary, pre-transfer, and transfer/separation corona units, and clean them with low viscosity oil.		
18	Release the lower transfer guide unit.		
19	Remove the black developing assembly.	Check that the developing cylinder is free of dirt or damage.	
20	Pull the blank exposure unit to the front slightly, and hook it on the rail base.		See Figure 5-8.
21	Remove the drum centering plate.		
22	Wipe the drum dry with lint-free paper.		
23	Attach the protective sheet on the drum.		
24	Mount the drum on the copier, and remove only the protective sheet.	Check that the lower transfer guide plate is released.	Keep the protective sheet next to the waste toner receptacle of the copier.
25	Mount the centering plate.		
26	Check that the developing assembly rail mount is released, and mount the black developing assembly.	• Check that the opening of the hopper and that of the black developing assembly are engaged. • Check that the black developing assembly is securely inside, and its lever and that of the rail mount are engaged.	See Figure 5-9.
27	Connect the two connectors to the black developing assembly		
28	Mount the blank exposure unit and pre-transfer corona unit.		
29	Mount the primary and transfer/separation corona units, and connect the connector.		
30	Apply toner over the cleaning blade; use toner around the magnet roller of the drum cleaning unit. Mount the cleaning unit.		The magnet roller is coated with toner at time of shipment from the factory.
31	Mount the lower transfer guide and feeder unit, and close the delivery unit.		
32	Mount the paper deck door.		See Figure 5-10.
33	Insert the switch actuator into the door switch of the front door, and turn the power switch ON.		
34	Set copy paper in the cassette, and set the cassette into the copier.		

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Step	Procedure	Check	Remarks
35	Supply toner into the hopper.		Shake the toner bottle well.
36	Mount the copy tray on the copier.		
38	Press SW901 on the jam location PCB.		
39	Check the drum sensitivity in the service mode: ⊠ , 3 , ⊠ ; 'DRUM_SEL'. Enter the setting, and press the ID and # keys.		
40	Select 'TONER-S' in the service mode; ⊠ , 4 , ⊠ . Press the CASSETTE SELECTION key to execute the toner supply mode.	Close the front doors to keep the inside of the copier free of light.	The copier operates for 3 min max. during which toner is supplied from the hopper to the developing assembly. Do not turn the power OFF while the copier is operating.
41	Install the CD unit.		Refer to the "INSTALLATION OF CD UNIT."
42	Set a Test Sheet on the copyboard, and make copies. Check the copy image.	● Check for abnormal noise. ● Check copy images for each fixed reproduction ratio. ● Check that the copy operation is normal for the specified number of copies. The first 10 or so copies may have black stripes caused by the cleaning blade. The condition is normal and should disappear as copies are made further.	If the density differs between left and right, adjust the height of the primary corona unit wire at the rear to correct it.
43	Make copies manually.	Check that the copy operation is normal.	
44	For the NP-6650, make copies in the single-sided document → trwo-sided copies or two-sided document → two-sided copy mode.	● Check for abnormal noise. ● Check that paper feeding is normal in the duplexing unit and RDF-II.	
45	Set the user options according to the user's needs.		See descriptions for the service mode (⊠ , 5 , ⊠).
46	Mount all covers.		
47	Attach the pocket for the Operator's Manual on the rear panel.		
48	Clean the areas around the copier.		
49	Move the copier to its final location. Turn the stopper screws to fix the copier in place.	● Check that the copier is more or less level.	See Figure 5-12.
50	Enter necessary information on the Service Sheet.		

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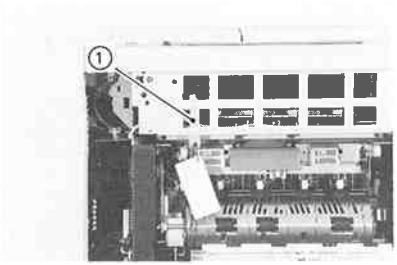
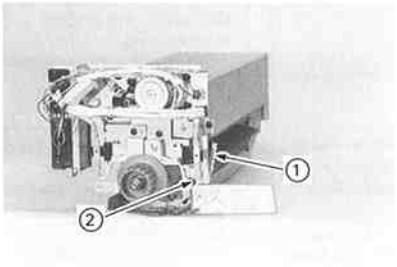


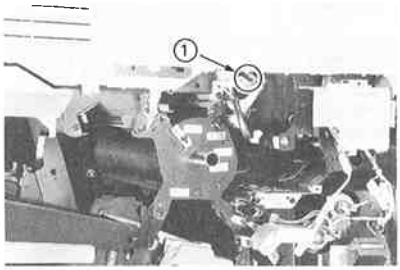
① Fixing plate

Figure 5-6



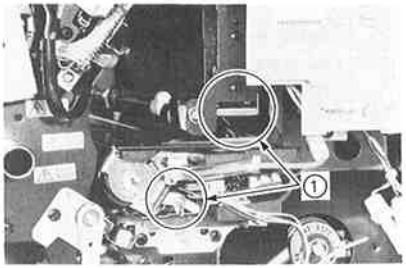
① Engage lever ② Fixing screw

Figure 5-7



① Blank exposure lamp hook

Figure 5-8



① Check.

Figure 5-9

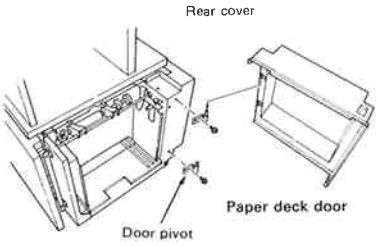
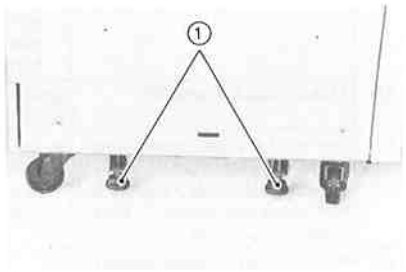


Figure 5-10



① Stop screws

Figure 5-11

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III. RELOCATION OF COPIER

If the copier needs to be relocated by truck or other means of transportation, perform the following:

Step	Procedure	Checks	Remarks
1	Make a copy in ENLARGEMENT (200%).		Moves to the metal fixings without lifting the lens.
2	Remove the drum.	Keep the drum in a box for transport.	
3	Secure the scanner with screws.		
4	Remove the CD unit.	Keep the CD unit in a box for transport.	
5	Tape the corona units and feeder unit release lever in place so that they will not shake out of the place because of vibration.		
6	Tape the front doors and delivery unit.		
7	Place an Ledger copy sheet on the copyboard glass, and tape the copyboard cover or RDF-II.		

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IV. INSTALLATION OF CD UNIT

1) Remove the three screws, and remove the upper cover of the CD unit.

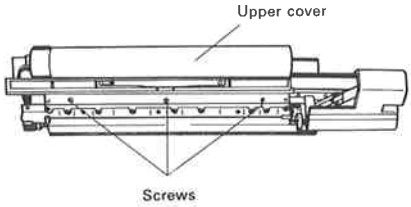

Figure 5-13

2) Turn the funnel on the starter container counterclockwise, and remove it.

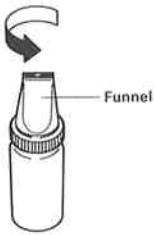

Figure 5-14

3) Peel the seal from the starter container.

Figure 5-15

4) Put the funnel back on the starter container.

5) Pick the plastic sheet to gain access to the opening of the CD unit, and stick the tip of the starter container.

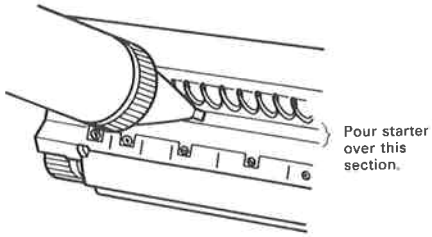

Figure 5-16

6) Pour the starter evenly.

Note:
Take care not to spill the starter. Inadequate starter can result in foggy images.

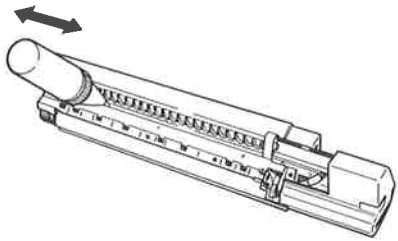

Figure 5-17

7) Turn the gear at the rear of the CD unit clockwise to distribute the starter over the developing cylinder.
8) Mount the upper cover of the CD unit.
9) Shake the CD unit end-to-end several times.
10) Remove the two screws, and remove the handle of the CD unit.

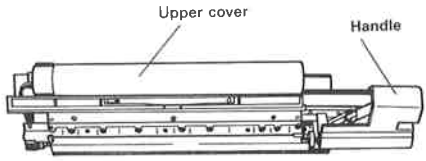

Figure 5-18

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11) Cut the wire resistors on the toner concentration detection PCB to suit the color of the toner.

Wire resistor	Red	Blue
JP801 / R820	–	Cut
JP802 / R821	–	–
JP803 / R822	–	–

Table 5-1

12) Install the CD unit in the copier.
13) Insert the door switch actuator into the door switch, turn the power switch ON, and wait for the warm-up to complete.
14) Press SW 901 on the jam indication PCB.
15) Press the ☒ , 4, and ☒ keys on the control panel.
16) Press the ↓ key to select 'CD_ROT'.
17) Adjust the color density. Keep a screwdriver handy for the VR, and press the CASSETTE SELECTION key.
    - The copier operates for 60 seconds. Adjust VR801 on the color toner concentration detection circuit PCB so that the green LED (LE802) lights or flashes and the red LED (LE801) goes out 30 seconds after the copier starts to operate.

Note:
1. Use VR801 only. Do not touch VR802 for installation.
2. Do not pull out the door switch actuator or turn the power switch OFF during this time. If the power is OFF, repeat step 14) and onward.

18) Remove the CD unit from the copier; be sure to keep the CD unit horizontal.
19) Fit the handle removed in step 10).
20) Attach the toner color label on the handle.
21) Install the CD unit in the copier.
22) Shake the toner cartridge left and right several times.

23) Align the tab at the tip of the toner cartridge with the groove in the upper cover of the CD unit; while peeling the seal, insert the cartridge into the CD unit with care.

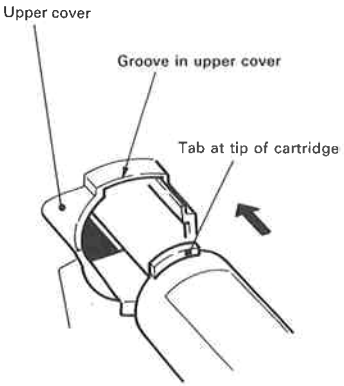

Figure 5-19

24) When the toner cartridge stops, turn it slowly clockwise.
25) Turn the toner cartridge left and right several times, and turn it fully clockwise until it stops.

Note:
Keep the toner cartridge inside the CD unit.

26) Pull out the door switch actuator, and close the front doors.
27) Make copies on paper to check the images.

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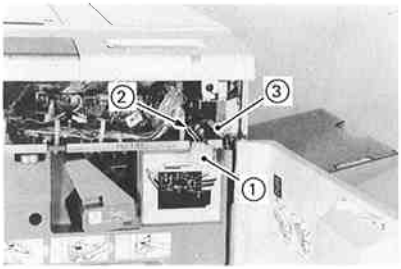
V. INSTALLATION OF CONTROL COUNTER II AND CONTROL CARD III SOCKET

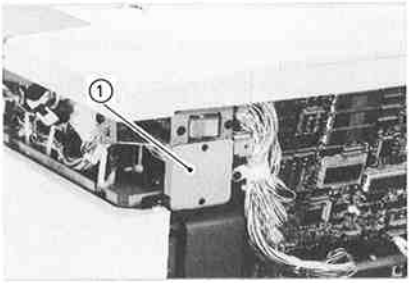
1) Remove the upper front panel and upper right panel.
2) Cut the jumper wire shown in Figure 5-20.



① Jumper wire
② 4P connector
③ 1P connector

Figure 5-20

3) Remove the blanking plate.



① Blanking plate

Figure 5-21

4) Connect the connector from the control counter and control card socket to the 4P connector (harness side) shown in Figure 5-20.
   - If the socket is for Control Card III, connect the 1P connector also.
5) Fix the socket with two screws.

Note:
Fix it so that the arrow on the socket points left.

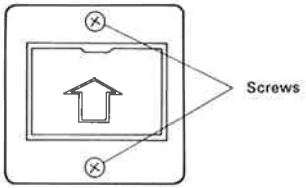
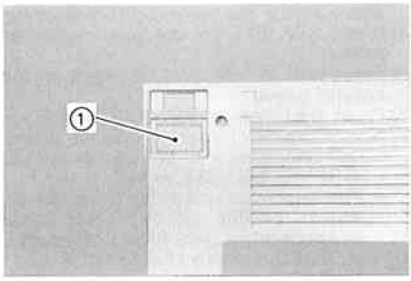


Figure 5-22

6) Cut a hole for the control counter or control card in the upper right panel with a knife.



① Cut here.

Figure 5-23 Upper Right Panel

7) Mount the upper right panel.
8) Insert the control counter or control card, and check the operation of the copier and counter or card.

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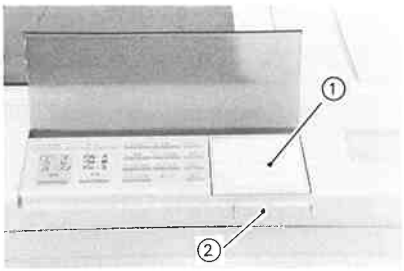
VI. INSTALLATION OF CONTROL CARD V

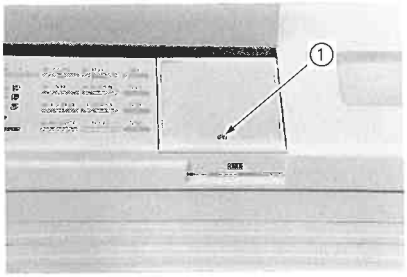
1) Remove the upper right panel.
2) Remove the upper front panel.
3) Remove the control panel.
4) Remove the transparent sheet used over the memory sheet and card slot cover.



① Transparent sheet ② Card slot

Figure 5-24

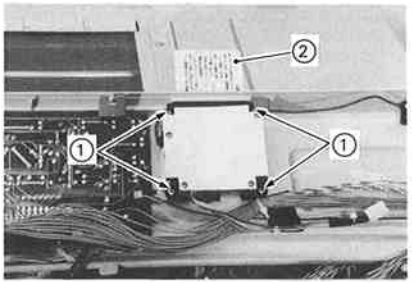
5) Remove the screw from the blanking plate.



① Mounting screw

Figure 5-25

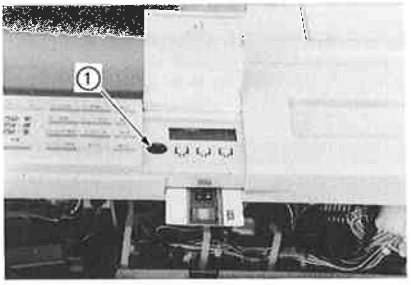
6) Turn over the control panel.
7) Fit the plastic sheet over the indication hole for Control Card V in the control panel.
8) Peel the protective sheet from the display of Control Card V.
9) Fix Control Card V on the control panel with four mounting screws.
   At the time, insert a card into Control Card V, and fix Control Card V where insertion/removal of the card is smooth.



① Mounting screws ② Card

Figure 5-26

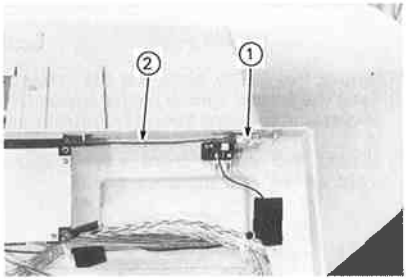
Make sure that the connector for the printer is centered over the hole.



① Connector

Figure 5-27

10) Fix the grounding wire of Control Card V with a screw (M3 X 10; provided).



① Mounting screw ② Grounding wire

Figure 5-28

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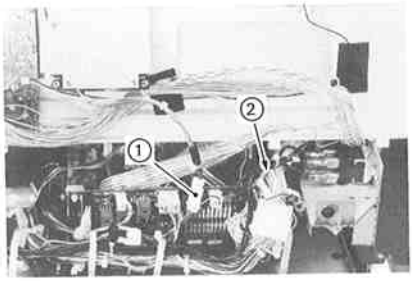
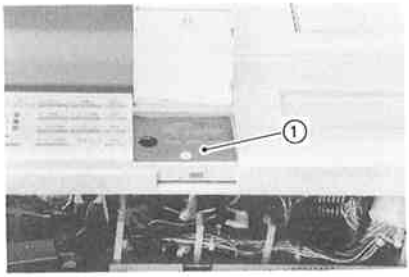
11) Cut the jumper wire of the 4P connector shown in Figure 5-29.
12) Connect the 4P connector of Control Card V to the 4P connector of the copier.



① 4P connector ② Juper wire

Figure 5-29

13) Peel the protective sheet from the guide panel of Control Card V.
14) Attach the guide panel of Control Card V on the control panel of the copier.



① Guide panel

Figure 5-30

15) Mount the guide panel on the copier.
16) Turn the power switch of the copier ON, and check the operation of Control Card V.
17) Mount the upper front cover, upper right cover, and memory sheet.

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CHAPTER 6

MAINTENANCE AND SERVICING

I. PARTS TO BE REPLACED PERIODICALLY 6-1
II. EXPECTED SERVICE LIVES DURABLES 6-2
III. BASIC PROCEDURES FOR PERIODIC SERVICING 6-5
IV. PREVENTIVE MAINTENANCE SERVICING SCHEDULE 6-6

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I. PARTS TO BE REPLACED PERIODICALLY

Parts scheduled for replacement should be changed before any troubleshooting or repairing is performed, even though they may be functioning properly and show no signs of wear. This is a safety precaution and helps to maintain the copier at its peak performance. Parts should be replaced during the regular service visit closest to the end of the service life of the part.

End of Nov, 1993

No.	Description	Part No.	Q'ty	Service life (number of copies)	Remarks
1	Corona wire	FY3-0030-000	AR	80,000	100 V
		FY3-0040-000	AR	80,000	115/220/240 V
2	Cleaner, thermistor (Fixing assembly)	FF1-6756-020	1	80,000	
3	Ozone filter (Feeder unit)	FA5-4316-000	1	200,000	or 1 year
4	Ozone filter (Rear panel)	FA5-4089-000	1	200,000	or 1 year
5	Roller, space (Developing assembly)	FA5-3770-000	2	480,000	
6	Side seal, front (Developing assembly)	FA5-4252-000	1	480,000	
7	Side seal, rear (Developing assembly)	FA5-4251-000	1	480,000	
8	Side seal, front, rear (Drum cleaning unit)	FA5-4564-000	2	480,000	

Note:
Numbers indicated in the table are estimates only and are subject to change.

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II. EXPECTED SERVICE LIVES OF DURABLES

The parts listed below may require replacement during the warranty period, but are to be replaced only if they are faulty or worn. The expected service lives of these parts are as follows.

End of Nov, 1993

No.	Description	Part No.	Q'ty	Service life (number of copies)	Remarks
1	Scanning lamp	FH7-3159-000	1	120,000	100 V
		FH7-3160-000	1	120,000	115 V
		FH7-3161-000	1	120,000	220/240 V
2	Scraper (Roller electrode unit)	FA5-4168-000	1	120,000	
3	Claw, separation (Drum cleaning unit)	FA3-1937-020	4	120,000	
4	Cleaning belt (Fixing assembly)	FA5-3720-000	1	120,000	
5	Separation roller (Paper deck unit)	FA3-8740-000	2	120,000	
6	Pick-up roller (Pick-up unit)	FF9-0581-030	6	200,000	
7	Grid wire (Primary corona unit)	FY1-0883-000	AR	200,000	
8	Wire cleaner (Primary corona unit)	FF2-0498-000	1	200,000	
9	Wire cleaner (Transfer/separation corona unit)	FF2-0337-040	1	200,000	
10	Frame cleaner (Transfer/separation corona unit)	FF2-0335-000	1	200,000	
11	Cleaning blade (Drum cleaning unit)	FA4-1827-000	1	200,000	Both edges can be used (100,000 copies per edge)
12	Upper roller (Fixing assembly)	FA5-7730-000	1	200,000	or 1 year
13	Claw, separation, upper (Delivery unit)	FA3-2762-050	5	200,000	
14	Pick-up roller (Paper deck unit)	FA5-7789-000	2	320,000	
15	Blank exposure lamp	FH7-3163-020	1	320,000	
16	Thermistor (Fixing assembly)	FH7-7159-000	1	320,000	
17	Lower roller (Fixing assembly)	FA5-5156-000	1	320,000	
18	Claw, separation, lower (Delivery unit)	FA2-8345-000	5	320,000	
19	Grid wire (Separation corona unit)	FY1-0883-000	AR	400,000	May be replaced on a unit basis.
20	Developing cylinder (Black developing assembly)	FA5-4241-000	1	400,000	
21	Separation and feeder roller (Pick-up unit)	FA3-8733-020	6	480,000	

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No.	Description		Part No.	Q'ty	Service life (number of copies)	Remarks
22	Filter		FF1-6230-000	1	480,000	
23	Pre-conditioning exposure lamp		FH7-3162-000	1	480,000	
24	Standard white plate		FA5-4085-030	1	480,000	
25	Separation/feeder unit roller (No. 2 pick-up unit)		FA5-3449-020	2	480,000	
26	Oil seal (Hopper unit)		X71-9310-000	3	480,000	
27	Bushing, heat-insulating (Fixing assembly)		FA4-0627-000	1	480,000	
28	Bushing, heat-insulating (Fixing assembly)		FA3-2668-020	1	480,000	
29	Heater, halogen (Fixing assembly)	870W	FH7-4259-000	1	480,000	100 V
			FH7-4260-000	1	480,000	115 V
		1200 W	FH7-4261-000	1	480,000	220 V
			FH7-4262-000	1	480,000	240 V
30	Heater, halongen (Fixing assembly)		FH7-4263-000	1	480,000	100 V
			FH7-4264-000	1	480,000	115 V
31	Pretransfer corona unit		FG1-8257-000	1	480,000	
32	Separation claws drive unit (Drum cleaning unit)		FG1-3472-000	1	720,000	
33	Primary corona unit		FG1-8247-000	1	1,000,000	
34	Transfer/separation corona unit		FG1-8272-190	1	1,000,000	
35	Bushing ϕ4 (Black developing assembly)		FS2-1042-000	2	1,000,000	
36	Bushing ϕ6 (Black developing assembly)		FS2-1043-000	1	1,000,000	
37	Gear, 33T (Black developing assembly)		FS3-0172-000	1	1,000,000	
38	Gear, cam (Black developing assembly)		FS3-0173-000	1	1,000,000	
39	Gear, 18T (Black developing assembly)		FS3-0174-000	1	1,000,000	
40	Shaft, 16T gear (Black developing assembly)		FS3-0175-000	1	1,000,000	
41	Gear, 25T (Black developing assembly)		FS3-0176-000	1	1,000,000	
42	Seal (Black developing assembly)		FA3-2251-000	2	1,000,000	
43	Shaft, 14T gear (Black developing assembly)		FS2-0527-000	2	1,000,000	
44	Gear, 20T (Black developing assembly)		FS2-0528-000	1	1,000,000	

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No.	Description	Part No.	Q'ty	Service life (number of copies)	Remarks
45	Bushing (Black developing assembly)	FF2-0581-000	1	1,000,000	
46	Ring (Black developing assembly)	FA5-4264-000	3	1,000,000	
47	Arm, one-way (Black developing assembly)	FA5-4266-000	2	1,000,000	
48	Shaft (Black developing assembly)	FA5-4267-000	1	1,000,000	
49	Oil seal (Black developing assembly)	X71-9310-000	2	1,000,000	
50	Separation claw drive unit (Drum cleaning unit)	FG1-3472-000	1	1,000,000	
51	Oil seal, ϕ4 (Drum cleaning unit)	XG9-0143-000	1	1,000,000	
52	Oil seal, ϕ6 (Drum cleaning unit)	XG9-0111-000	1	1,000,000	
53	Oil seal, ϕ8 (Drum cleaning unit)	X71-9310-000	4	1,000,000	
54	Lever, one-way (Drum cleaning unit)	FA5-4559-000	1	1,000,000	
55	Lever, one-way (Drum cleaning unit)	FA5-4560-000	1	1,000,000	
56	Gear, 28T (Drum cleaning unit)	FS3-0170-020	1	1,000,000	
57	Gear, 26T (Drum cleaning unit)	FS3-0171-000	1	1,000,000	
58	Felt, side (Drum cleaning unit)	FA5-4550-000	2	1,000,000	
59	Gear, 26T (Drum drive unit)	FS3-0169-000	1	1,000,000	
60	Bushing (Fixing assembly)	FS2-1044-000	1	1,000,000	
61	Cam, gear (Fixing assembly)	FS2-0130-000	1	1,000,000	
62	Gear, (Fixing assembly)	FS2-0570-000	1	1,000,000	
63	Roller, delivery (Inner delivery unit)	FA5-4420-000	1	1,000,000	
64	Roller, deliver (Outer delivery unit)	FA4-0713-000	1	1,000,000	
65	Roller, scanner (Scanner unit)	XG9-0089-000	2	1,000,000	
66	Pick-up roller (pick-up 2 unit)	FA5-4534-020	2	1,000,000	
67	Registration roller 2	FA5-4068-000	1	1,000,000	
68	Scanner drive cable	FG9-2492-000	1	1,000,000	
69	Bushing (developing assembly)	FF2-0581-000	1	1,000,000	
70	Eliminator, static charge (Fixing unit)	FA4-0623-000	1	1,000,000	
71	Eliminator, static charge (Outer delivery unit)	FA4-0715-000	1	1,000,000	

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III. BASIC PROCEDURES FOR PERIODIC SERVICING

Note:
1. As a rule, periodic servicing should be performed every 40,000 copies.
2. Before making a visit, check user's file and prepare parts that may require replacement.

Step	Procedure	Check	Remarks
1	Speak with the person in charge.	Check the condition of the machine.	
2	Record the counter reading.	Check the number of problem copies.	
3	Make test copies. (DIRECT, REDUCTION, ENGLARGEMENT, two-page separation, two-sided, image overlay)	Check for: a. Copy density b. Soiled background. c. Sharpness of lines d. Leading-edge blank area e. Left and right blank strips f. Fixing, registration, marks on backs of copies g. Unusual noises h. Operation of counters	Standard: 3.5±1.5mm (1 : 1) Standard: 2.5±1.3mm (1 : 1)
4	Clean the corona units.		Wipe with dry lint-free paper; then clean with alcohol.
5	Clean the separation and feeder units. ● Separation ● Toner catch tray		
6	Clean the fixing and delivery areas. ● Paper guide ● Separation claws (upper and lower) ● Static charge eliminator Inspect the cleaning belt.		Use MEK. Use MEK.
7	Perform periodic servicing as required by the number of copies made. (See page 6-6.)		
8	Clean the copyboard cover and the copyboard glass.		
9	Check the waste toner.		
10	Make a test copy.		
11	Make a sample copy.		
12	Check the test and sample copies, and clean up the area around the copier.		
13	Record the number shown on the counter.		
14	Enter all relevant information on the service sheet. Inform the person in charge that servicing is complete.		

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IV. PREVENTIVE MAINTENANCE SERVICING SCHEDULE

Note:
Do not use solvents or oils other than those specified.

△: Clean ●: Replace ×: Lubricate ■: Adjust ◎: Check

Unit	Part	Periodic servicing				Remarks
		Every 40,000 copies	Every 80,000 copies	Every 200,000 copies	Every 480,000 copies	
Externals	Copyboard glass	△				Clean with alcohol.
	Ozone filter (Rear panel)		△	●		Or one year
Optical drive	Scanner rail		△×			Clean with alcohol, and lubricate with low-viscosity lubricating oil.
	Scanner drive cable		◎□			
Pick-up unit	Pick-up rollers		◎△			Check at initial 80,000th only.
Separation/ feeder unit	Registration rollers			△		Use a moist cloth.
	Transfer guides (upper and lower)	△				
	Feeder belt/paper feed guide	△				
	Feeder unit drive unit		×			Lubricate with low-viscosity lubrication oil.
	Ozone filter		△	●		Or one year.
Optical unit	Dust-proofing glass	△				Use a blower brush. If not sufficient, clean with alcohol.
	Mirrors 1-6	△				
	Lens	△				Use a blower brush.
	Scanning lamp side reflector	△				
	Scanning lamp reflector	△				
	Standard white plate	△				Use a moist cloth.
	Blank exposure lamp plastic	△				
	Lens rail			×		Lubricate with low-viscosity lubricating oil.
Corona units	Corona wire (Primary, pre-transfer, transfer, separation)	△	●			Wipe off with dry lint-free paper; then clean with alcohol.
	Grid wire (Primary, separation)	△				
	Corona unit frame	△				Use a moist cloth.
	Roller electrode	△				
	Roller electrode unit		△			Remove the waste toner.
Photosensitive drum	Photosensitive drum		△			Wipe with lint-free paper, clean with alcohol; then wipe with lint-free paper.

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Unit	Part	Periodic servicing				Remarks
		Every 40,000 copies	Every 80,000 copies	Every 200,000 copies	Every 480,000 copies	
Developing assembly	Roller, space				●	
	Side seal				●	
Drum cleaning unit	Magnet roller	◎				
	Separation claws	△				Use a moist cloth.
	Side seal				●	
Waste toner receptacle	Waste toner			◎		
Fixing assembly	Paper guide		△			Use MEK.
	Upper roller, Lower roller		◎△			Use cleaning oil.
	Thermistor		△			
	Gear		×			
	Clear (thermistor)		●			
Copy delivery unit	Separation claw (Upper, Lower)	△				Use MEK.
	Static charge eliminator			△		Remove paper dust, etc., with lint-free paper.
Pick-up 2 unit	Pick-up roller			△		
No. 2 feeder unit (upper)	Bushing (for drive from main motor)			×		Use low-viscosity lubricating oil.

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APPENDIX

A. GENERAL TIMING CHART A-1
B. LIST OF SIGNALS/ COMMANDS A-3
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D. DC CONTROLLER CIRCUIT DIAGRAM A-7
E. POTENTIAL MEASURING CIRCUIT DIAGRAM A-29
F. HIGH-VOLTAGE TRANS-FORMER 1 DIAGRAM A-30
G. HIGH-VOLTAGE TRANS-FORMER 2 DIAGRAM A-31
H. HIGH-VOLTAGE AC CONTROL DIAGRAM A-32
I. AC TRANSFORMER DIAGRAM A-33
J. BLACK TONER LEVEL CIRCUIT DIAGRAM A-34
K. COLOR TONER CONCENTRA-TION DETECTION CIRCUIT DIAGRAM A-35
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M. DOCUMENT SIZE DETECTION DIAGRAM A-37
N. JAM INDICATOR CIRCUIT DIAGRAM A-38
O. DRUM HEATER CONTROL CIRCUIT DIAGRAM A-39
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Q. WIRING DIAGRAM A-42
R. NP-EDITOR GENERAL CIRCUIT DIAGRAM A-45
S. NP-EDITOR CONTROL CIRCUIT DIAGRAM A-47
T. LIST OF SPECIAL TOOLS A-50
U. LIST OF SOLVENTS AND OILS A-52

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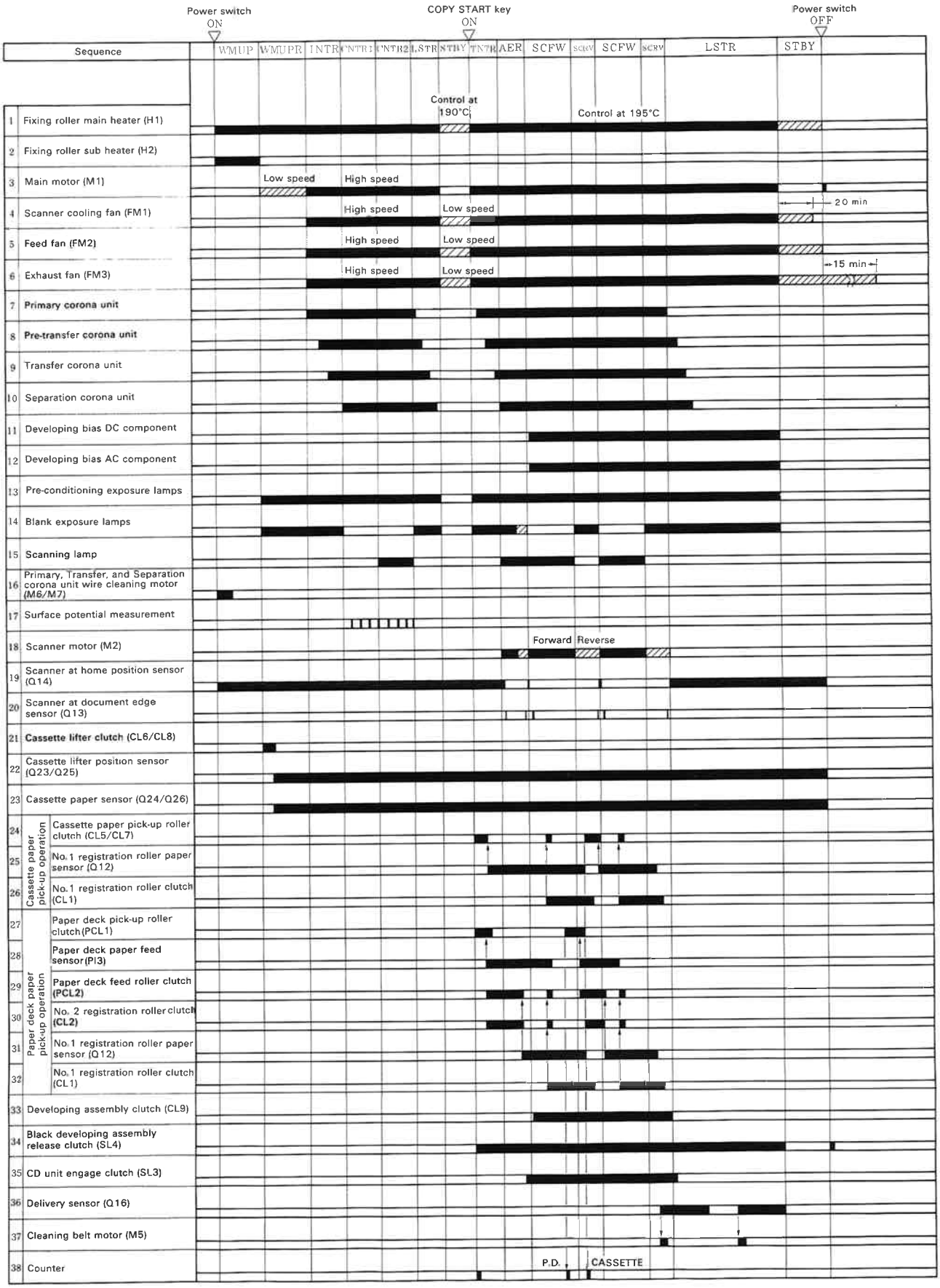
1. Two-page copying



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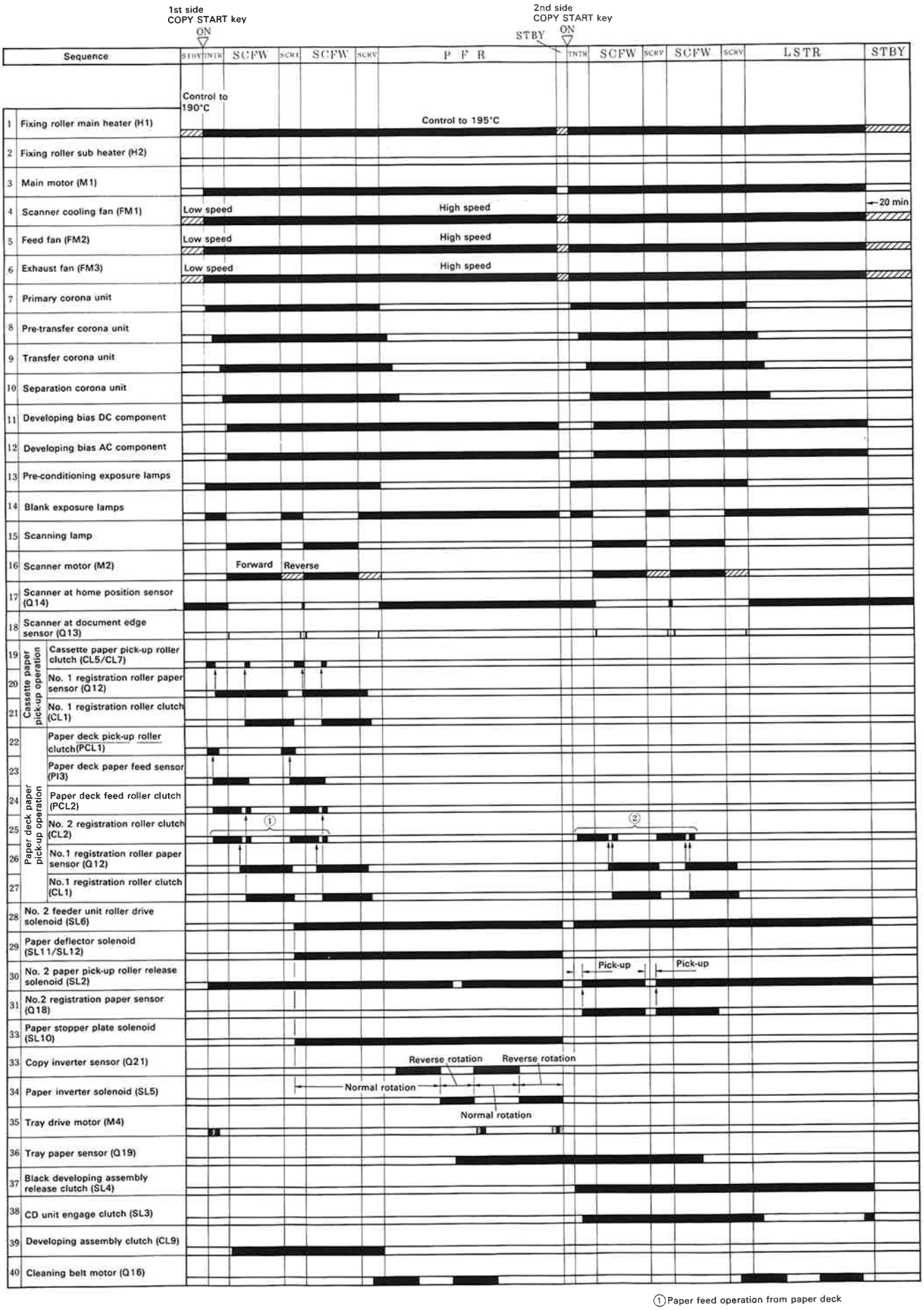
2. TWO-SIDED COPY (1st: Black copy, 2nd: color copy)



① Paper feed operation from paper deck

② Paper feed operation from No. 2 feeder unit

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1. SIGNALS AND COMMANDS

ACON	AC TRANSFORMER DRIVE command
AXFSD	AUXILIARY FEED CLUTCH SOLENOID DRIVE command
BDRSD	BLACK DEVELOPING ASSEMBLY RELEASE CLUTCH SOLENOID DRIVE command
BTEP	BLACK TONER OUT signal
BTSP	BLACK TONER SUPPLY signal
CBCC	COPY BOARD COVER CLOSED signal
CBOP	CLEANING BELT OUT PRECAUTION signal
CBOUT	CLEANING BELT OUT signal
CCNTD	CONTROL COUNTER DRIVE command
CCNNT	CONTROL COUNTER DETECT signal
CDIN	CD UNIT IN signal
CDMS0	TONER COLOR signal 0
CDMS1	TONER COLOR signal 1
CDMS2	TONER COLOR signal 2
CDPSD	CD UNIT ENGAGE CLUTCH DRIVE command
CLBSD	CLEANING BELT DRIVE SOLENOID DRIVE command
CLK	CLOCK PULSE signal
CSZ0	CASSETTE SIZE signal 0
CSZ1	CASSETTE SIZE signal 1
CSZ2	CASSETTE SIZE signal 2
CSZ3	CASSETTE SIZE signal 3
CTEP	COLOR TONER OUT signal
CTSSD	COLOR TONER SUPPLY SOLENOID DRIVE command
DFSD	FEED ROLLER 2 CLUTCH SOLENOID DRIVE command
DPSD1	DEFLECTOR SOLENOID DRIVE command 1
DPSD2	DEFLECTOR SOLENOID DRIVE command 2
DPSD3	L SIZE DEFLECTOR SOLENOID DRIVE command 3
DPSD4	M SIZE DEFLECTOR SOLENOID DRIVE command 4
DPUCD	DUPLEXING PICK-UP CLUTCH DRIVE command
DPRSD	NO. 2 PICK-UP ROLLER RELEASE SOLENOID DRIVE command
DRMD	DRUM (MAIN MOTOR) DRIVE command
DSIN	EDITOR SERIAL INPUT signal
DSOUT	EDITOR SERIAL OUTPUT signal
DSZ0	DOCUMENT SIZE signal 0
DSZ1	DOCUMENT SIZE signal 1
DSZ2	DOCUMENT SIZE signal 2
DVD	DEVELOPING UNIT CLUTCH DRIVE command
EFMD	EXHAUST FAN MOTOR DRIVE command
FCD	FEED CLUTCH DRIVE command
FDO	FRONT DOOR OPEN signal
FFMD	FEEDER SECTION FAN MOTOR DRIVE command
HMD	HOPPER MOTOR DRIVE command
HVBAC	AC DEVELOPING BIAS DRIVE command
[HVBDC]	DC DEVELOPING BIAS CONTROL command
[HVPCT]	PRE-TRANSFER CORONA CURRENT CONTROL command
[HVTPC]	PRIMARY CORONA CURRENT CONTROL command
[HVSCT]	SEPARATION CORONA CURRENT CONTROL command
[HVTTC]	TRANSFER CORONA CURRENT CONTROL command
IFMD	INTAKE FAN MOTOR DRIVE command
LAON	LAMP ON command
LCAST	LOWER CASSETTE SIZE DETECTION SWITCH READ signal
LEDD0	LED DRIVE command 0
LEDD1	LED DRIVE command 1
LEDD2	LED DRIVE command 2
LHP	LENS HOME POSITION signal
LIDE	LIFTER DRIVE ENABLE command
[LINT]	LIGHT INTENSITY signal
LLFTP	LOWER CASSETTE PAPER LIFTER POSITION signal
LLTCD	LOWER CASSETTE PAPER LIFTER CLUTCH DRIVE command
LMDP1	LENS MOTOR DRIVE PULSE1
LMDP2	LENS MOTOR DRIVE PULSE2
LMSTB	LENS MOTOR STROBE signal
LPEP	LOWER CASSETTE PAPER OUT signal
LPRSD	LOWER PICK-UP ROLLER RELEASE SOLENOID DRIVE command
LPUCD	LOWER CASSETTE PICK-UP ROLLER CLUTCH DRIVE command
LRD	LAMP REGULATOR DRIVE command
MFLSD	MULTIFEED LIFTER CLUTCH SOLENOID DRIVE command
MFS	MULTIFEEDER (MANUAL FEED) SELECT signal
MHTRD	MAIN HEATER DRIVE command
MMCLK	MAIN MOTOR CLOCK signal
MMOL	MAIN MOTOR OVER LOAD signal
MMSC	MAIN MOTOR SPEED CONTROL signal
MPPSD	MULTIFEED PICK-UP ROLLER RELEASE SOLENOID DRIVE command
MPUCD	MULTIFEED PICK-UP CLUTCH DRIVE command
PDP1	PAPER DETECTION signal 1
PDP2	PAPER DETECTION signal 2
PDP3	PAPER DETECTION signal 3
PDP4	PAPER DETECTION signal 4
PDP5	PAPER DETECTION signal 5
PDP6	PAPER DETECTION signal 6
PDP7	PAPER DETECTION signal 7
PEXP	PRE-CONDITIONING EXPOSURE LAMP LIT command
PFRSD	PAPER FEED ROLLER RELEASE SOLENOID DRIVE command
[POT]	SURFACE POTENTIAL signal
PCC1	PRIMARY CORONA UNIT WIRE CLEANER MOTOR DRIVE command 1
PCC2	PRIMARY CORONA UNIT WIRE CLEANER MOTOR DRIVE command 2
PRVP	PAPER REVERSE POSITION signal
PSS	PAPER STOPPER PLATE SOLENOID DRIVE command
PUCD	PICK-UP CLUTCH DRIVE command
RGCD1	REGISTRATION ROLLER1 CLUTCH DRIVE command
RGCD2	REGISTRATION ROLLER2 CLUTCH DRIVE command
RVSD	DELIVERY/REFEED ROLLER SOLENOID DRIVE command
SCDP	SCANNER AT DOCUMENT EDGE signal
SCFW	SCANNER FORWARD DRIVE command
SCHP	SCANNER HOME POSITION signal
SCMC	SCANNER MOTOR SPEED CONTROL command
SCMCLK	SCANNER MOTOR CLOCK signal
SCMD	SCANNER MOTOR DRIVE command
SCMOL	SCANNER MOTOR OVER LODE signal
SCNTD	SMALL COUNTER DRIVE command
SCRC0	REPRODUCTION RATIO signal 0
SCRC1	REPRODUCTION RATIO signal 1
SCRC2	REPRODUCTION RATIO signal 2
SCRV	SCANNER REVERSE DRIVE command
SCS	SEPARATION CLAWS ENAGE SOLENOID DRIVE command
SCSC	SCANNER MOTOR SPEED CONTROL signal
SCST	SCANNER MOTOR STOP command
SHTRD	SUB HEATER DRIVE command
TCC1	TRANSFER AND SEPARATION CORONA UNIT WIRE CLEANER MOTOR DRIVE command 1
TCC2	TRANSFER AND SEPARATION CORONA UNIT WIRE CLEANER MOTOR DRIVE command 2
TCNTD	TOTAL COUNTER DRIVE command
[TH1]	FIXING ROLLER SURFACE TEMPERATURE signal
THP	TRAY GUIDE PLATE HOME POSITION signal
TMDP1	TRAY MOTOR DRIVE PULSE1
TMDP2	TRAY MOTOR DRIVE PULSE2
UCAST	UPPER CASSETTE SIZE DETECTION SWITCH READ signal
ULFTP	UPPER CASSETTE PAPER LIFTER POSITION signal
ULTCD	UPPER CASSETTE PAPER LIFTER CLUTCH DRIVE command
UPEP	LOWER CASSETTE PAPER OUT signal
UPRSD	UPPER PICK-UP ROLLER RELEASE SOLENOID DRIVE command
UPUCD	UPPER CASSETTE PICK-UP ROLLER CLUTCH DRIVE command
WMDP1	CLEANING BELT MOTOR DRIVE PULSE1
WMDP2	CLEANING BELT MOTOR DRIVE PULSE2
WMSTB	CLEANING BELT MOTOR STROBE signal

2. STATUS

AER	AE (MEASUREMENT) ROTATION
CNTR	CONTROL ROTATION
INTR	INITIAL ROTATION
LSTR	LAST ROTATION
PFR	PAPER FEED ROTATION
SCFW	SCANNER FORWARD
SCRV	SCANNER REVERSE
STBY	STANDBY
WAIT	WAIT
WMUP	WARM-UP
WMUPR	WARM-UP ROTATION

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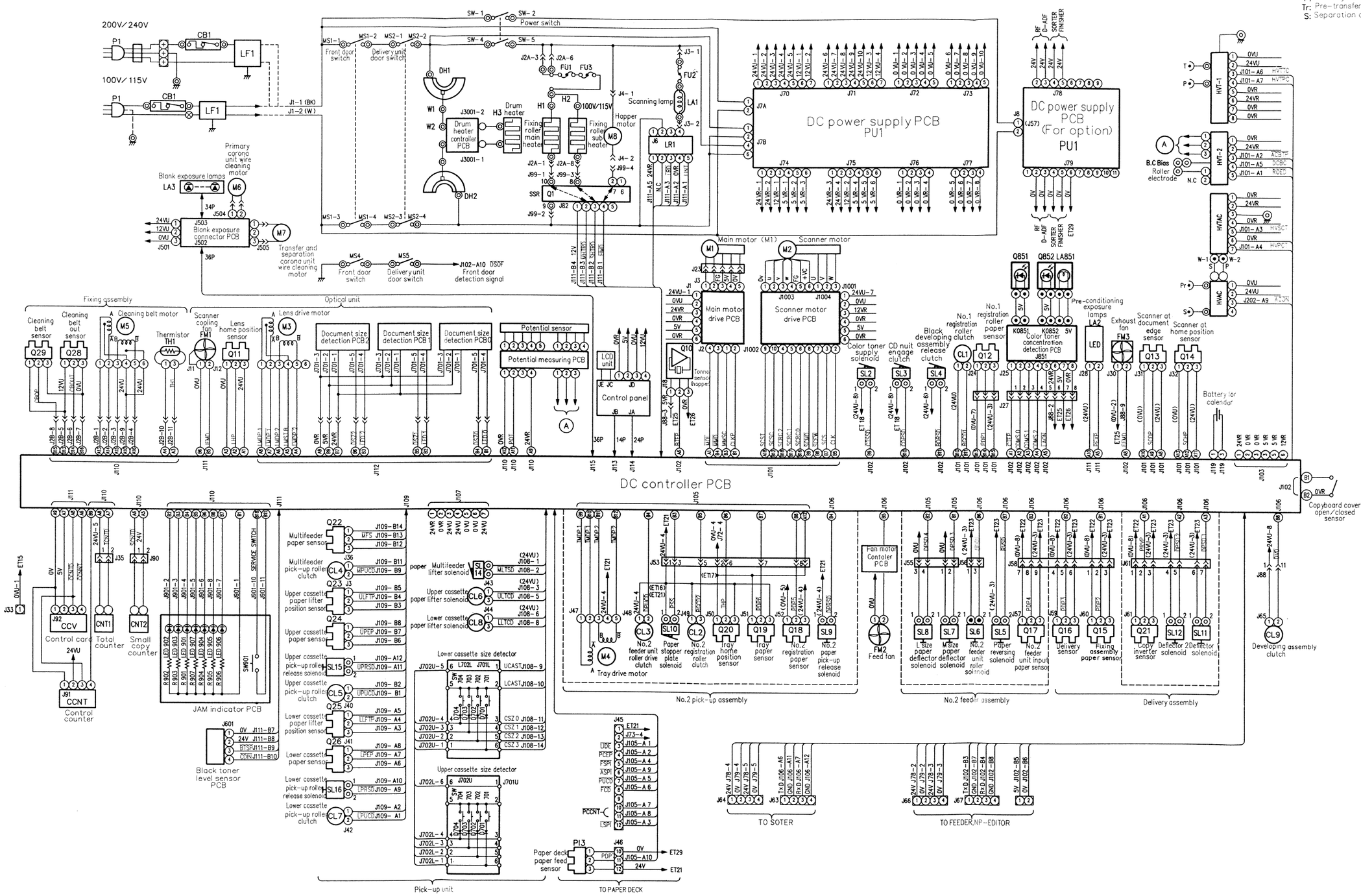
T: Transfer corona unit
P: Primary corona unit
Tr: Pre-transfer corona unit
S: Separation corona unit



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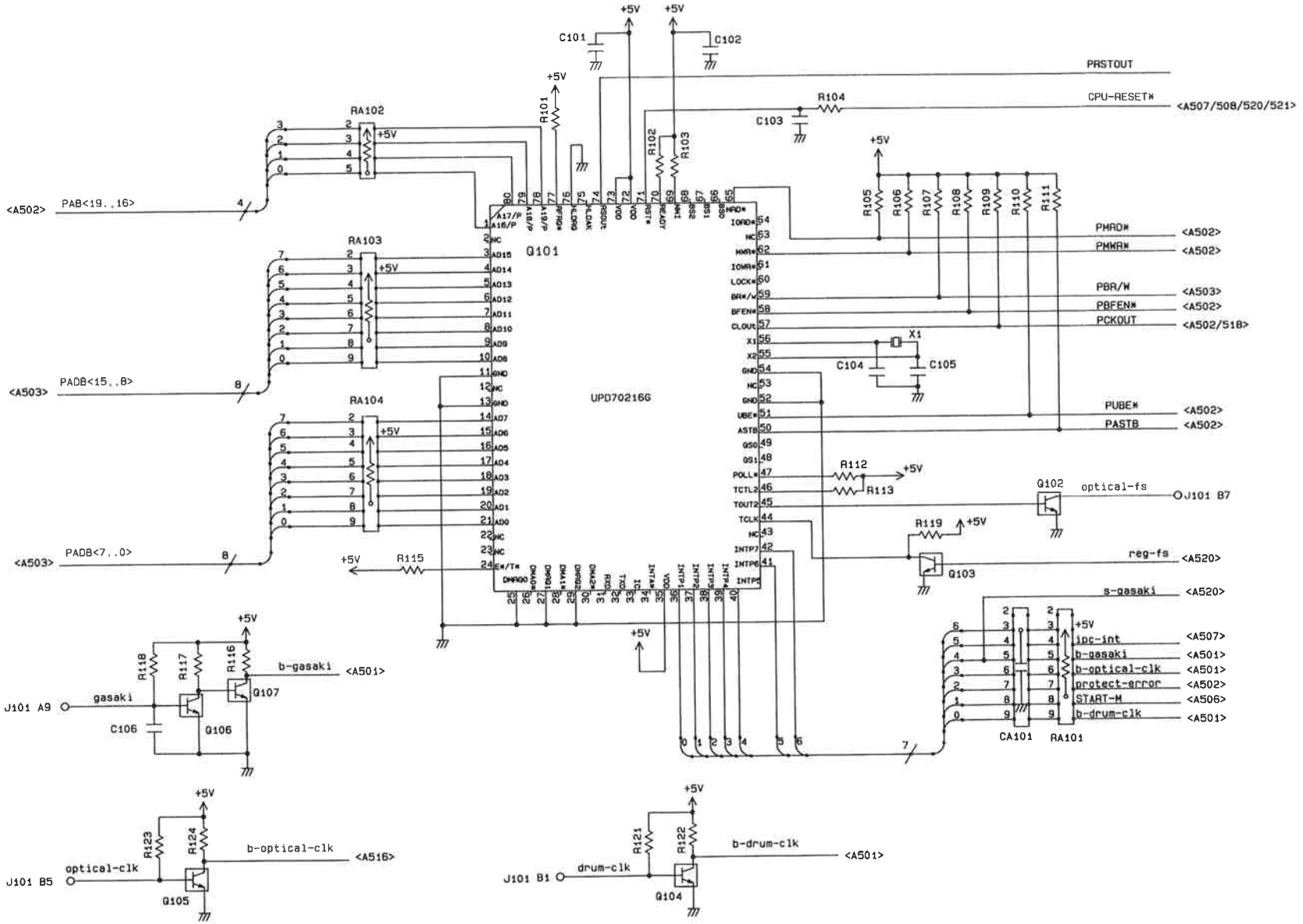

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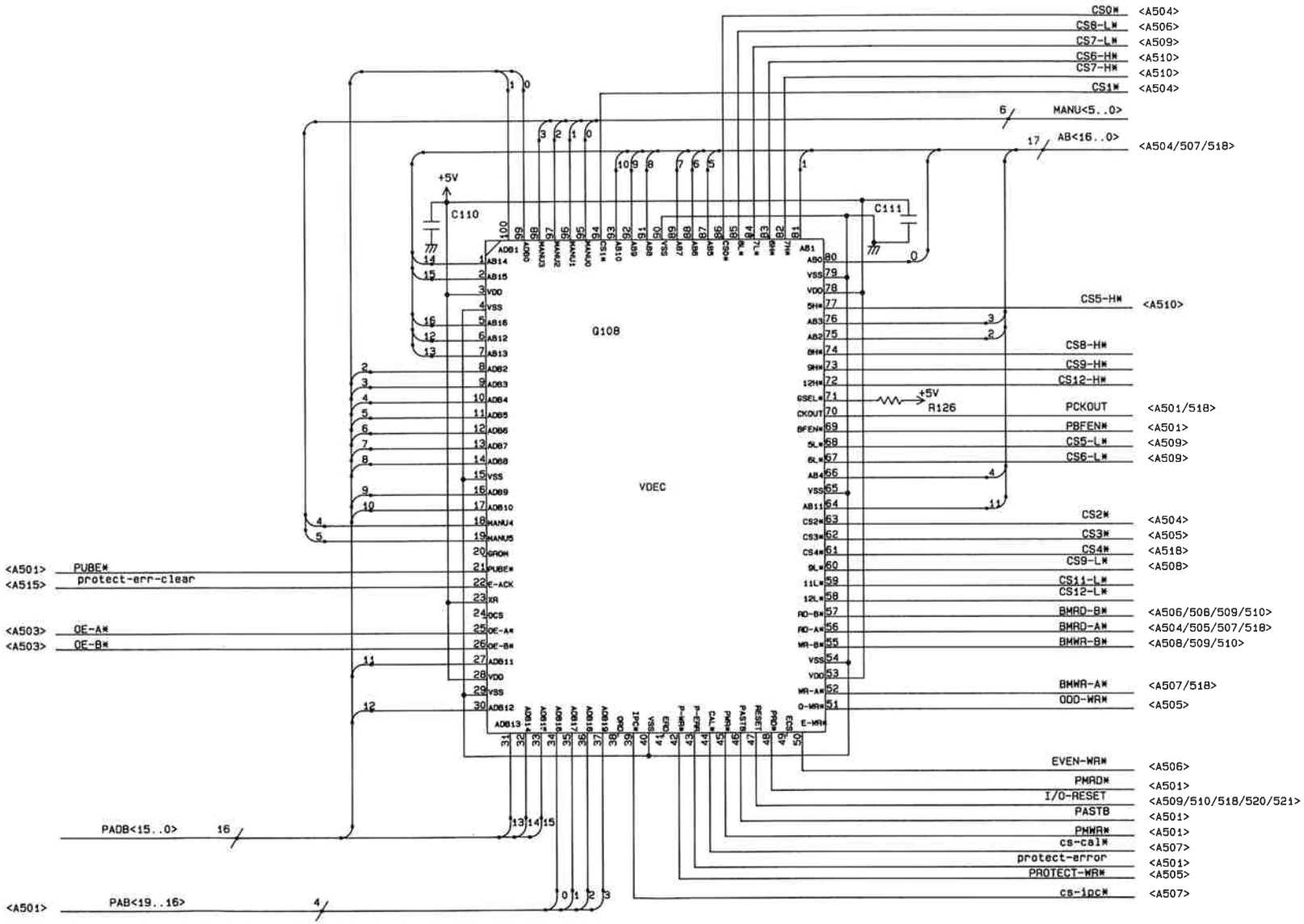

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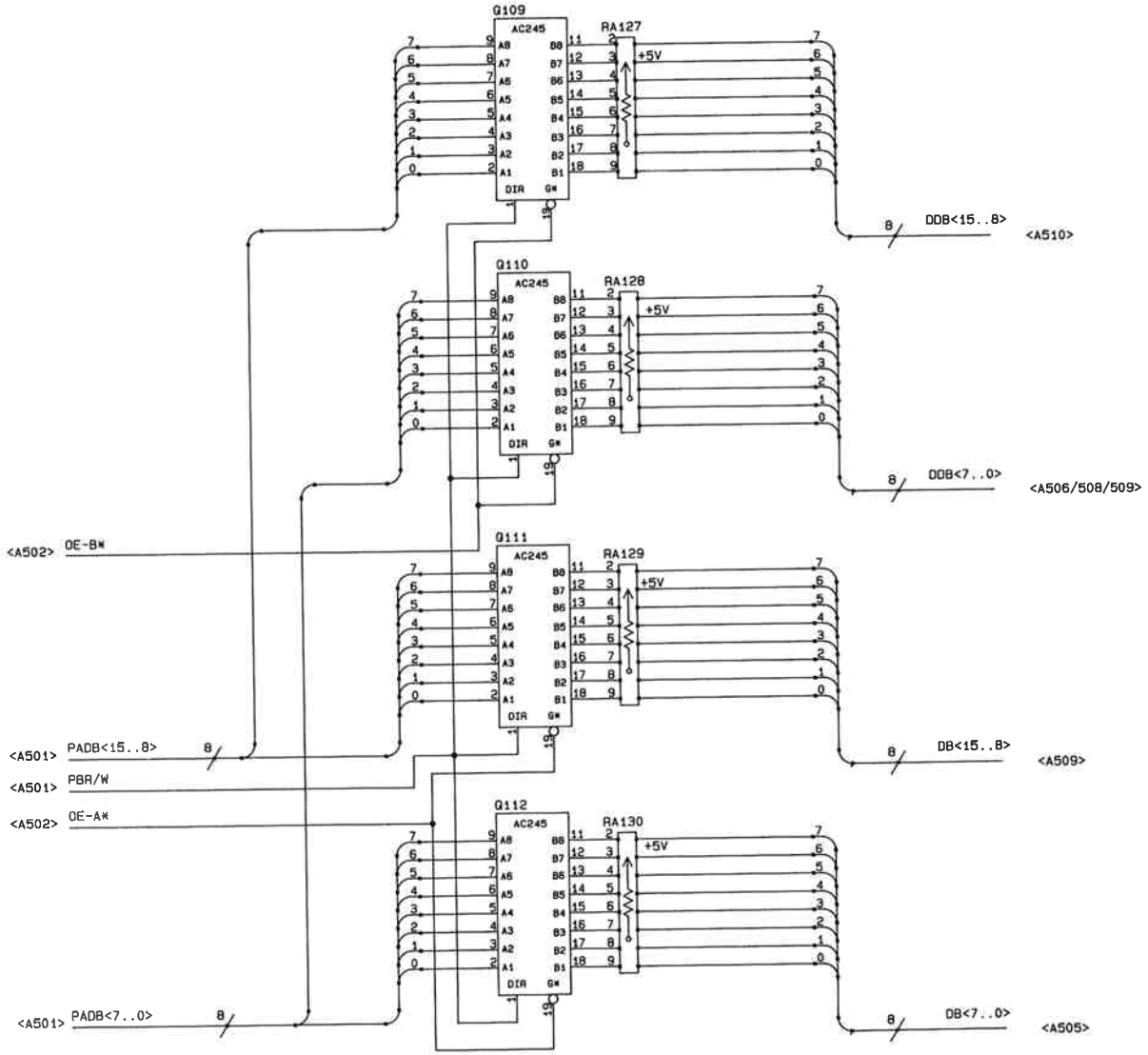

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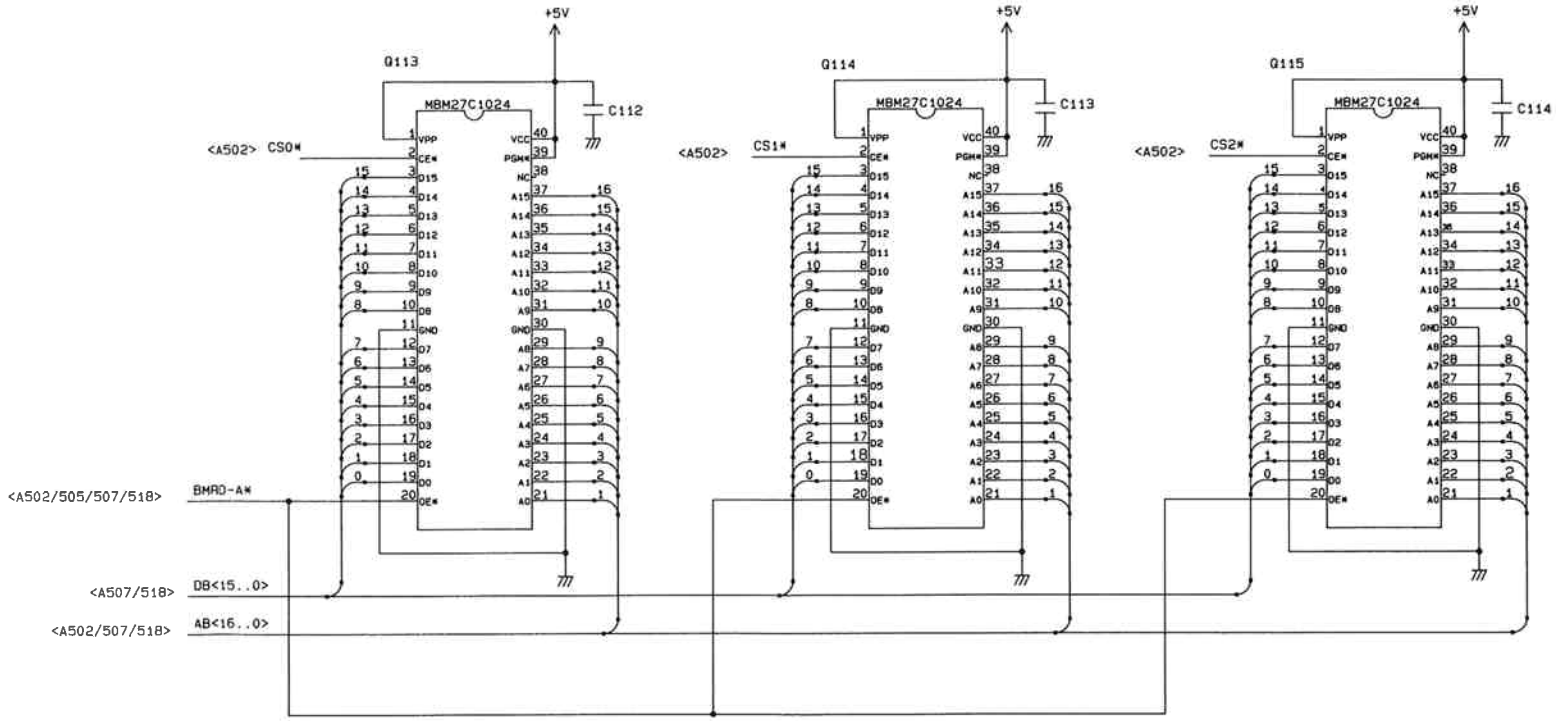

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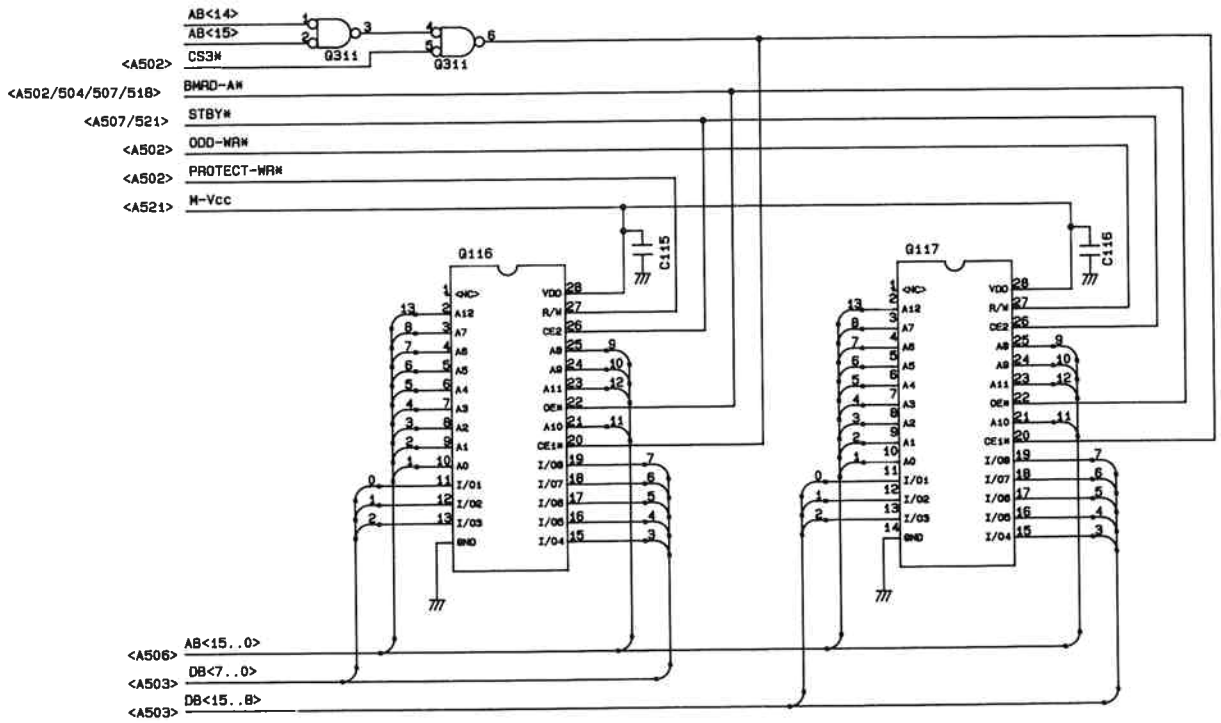

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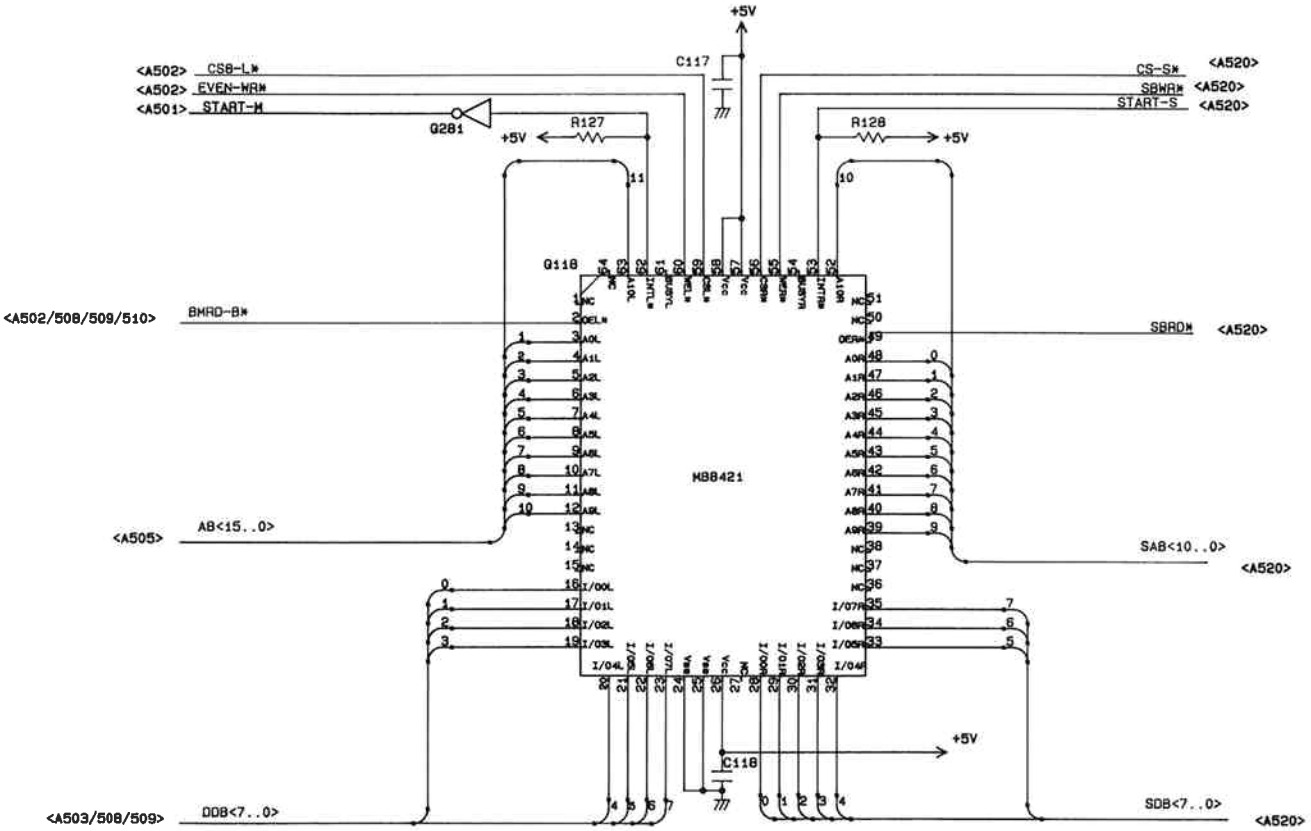

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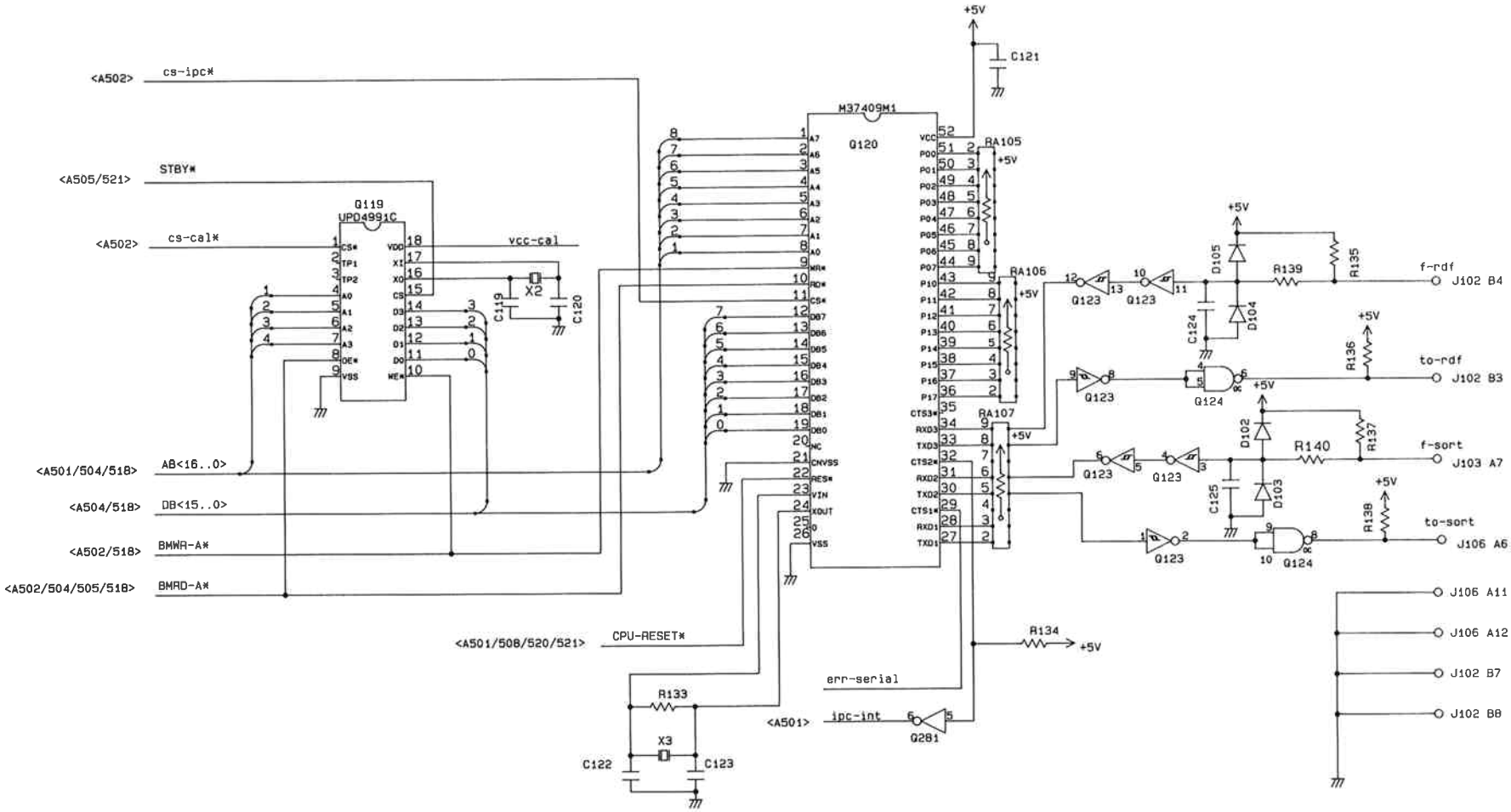

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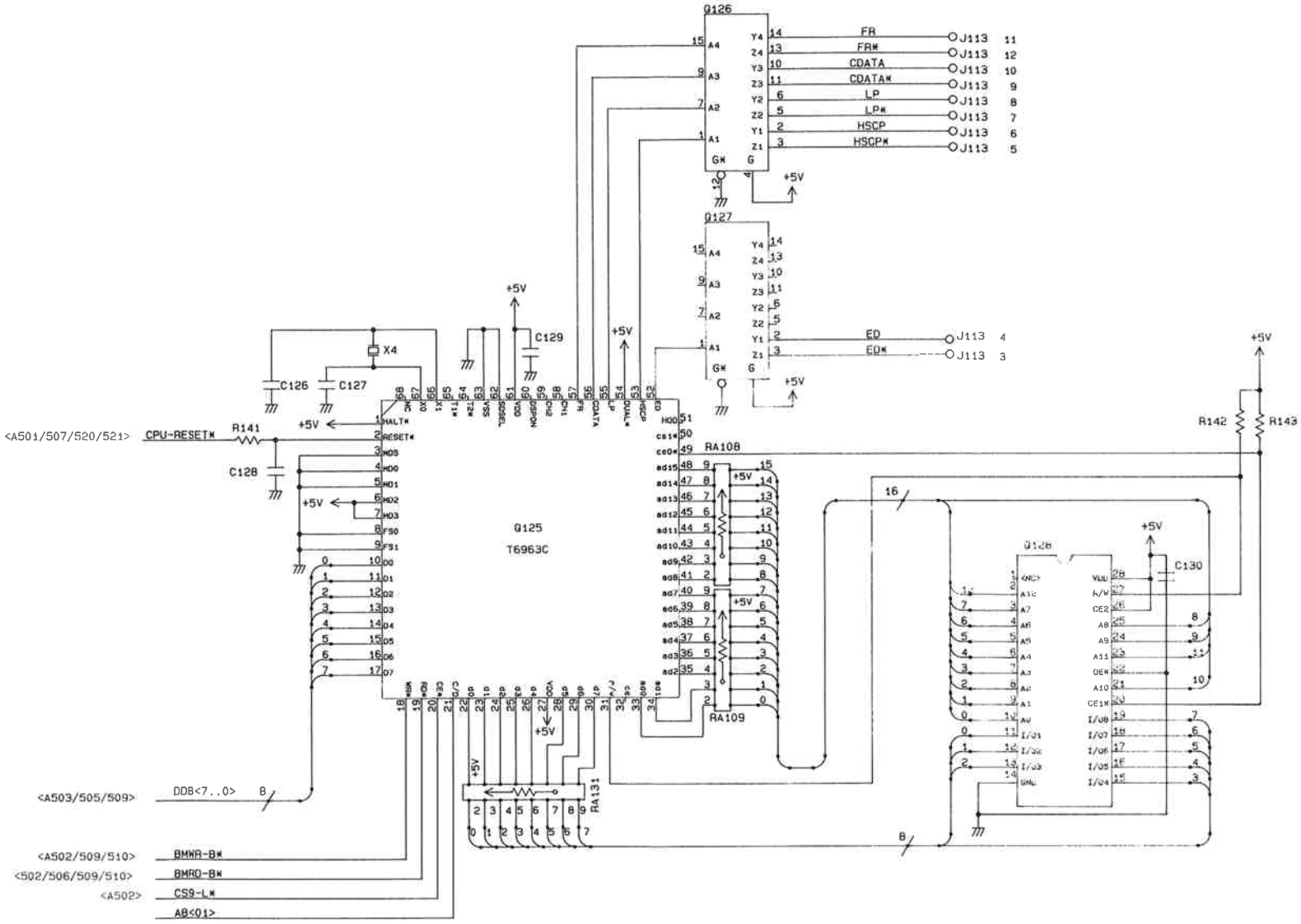
DC controller PCB (8/22 : A 508)



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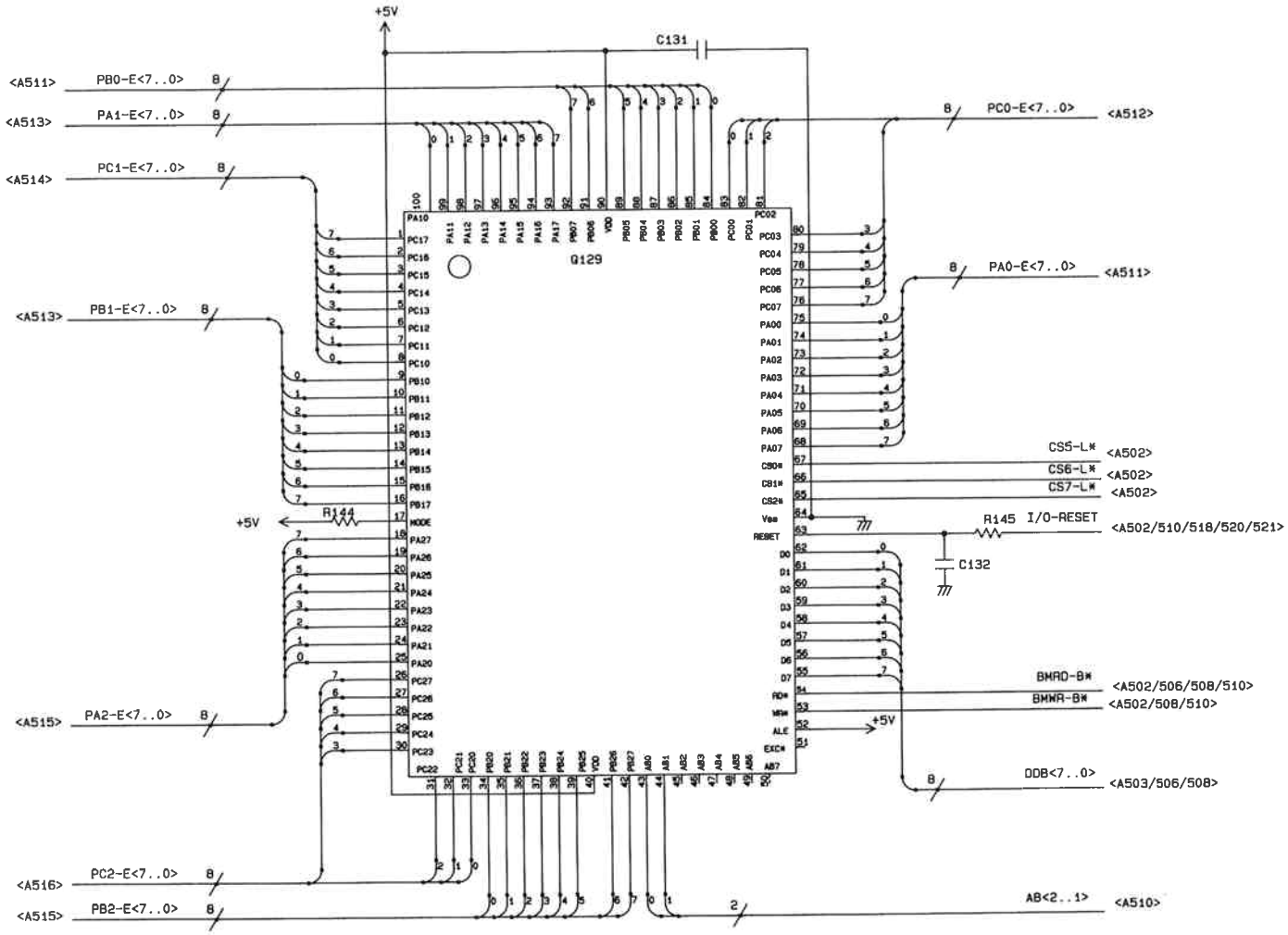

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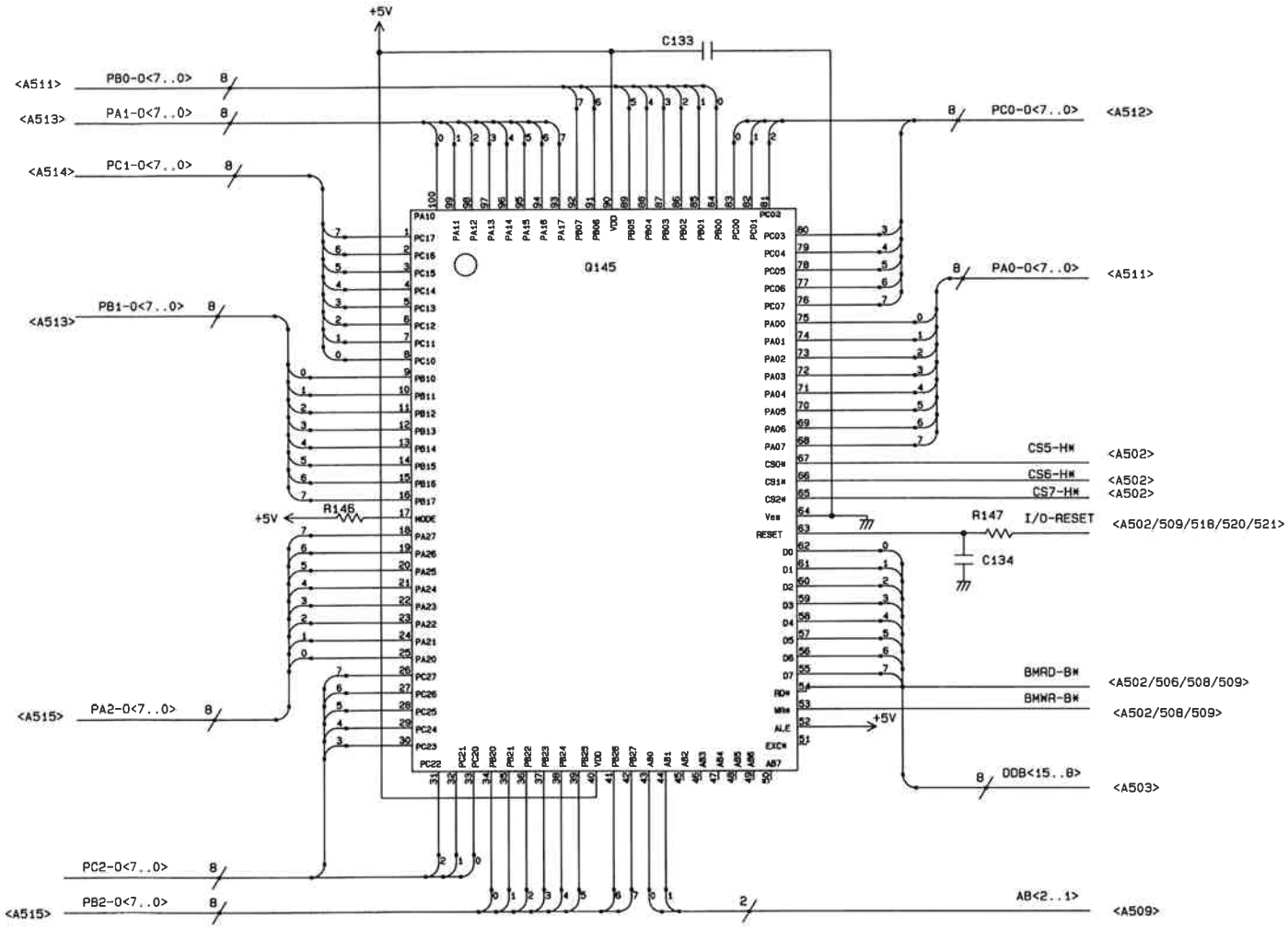

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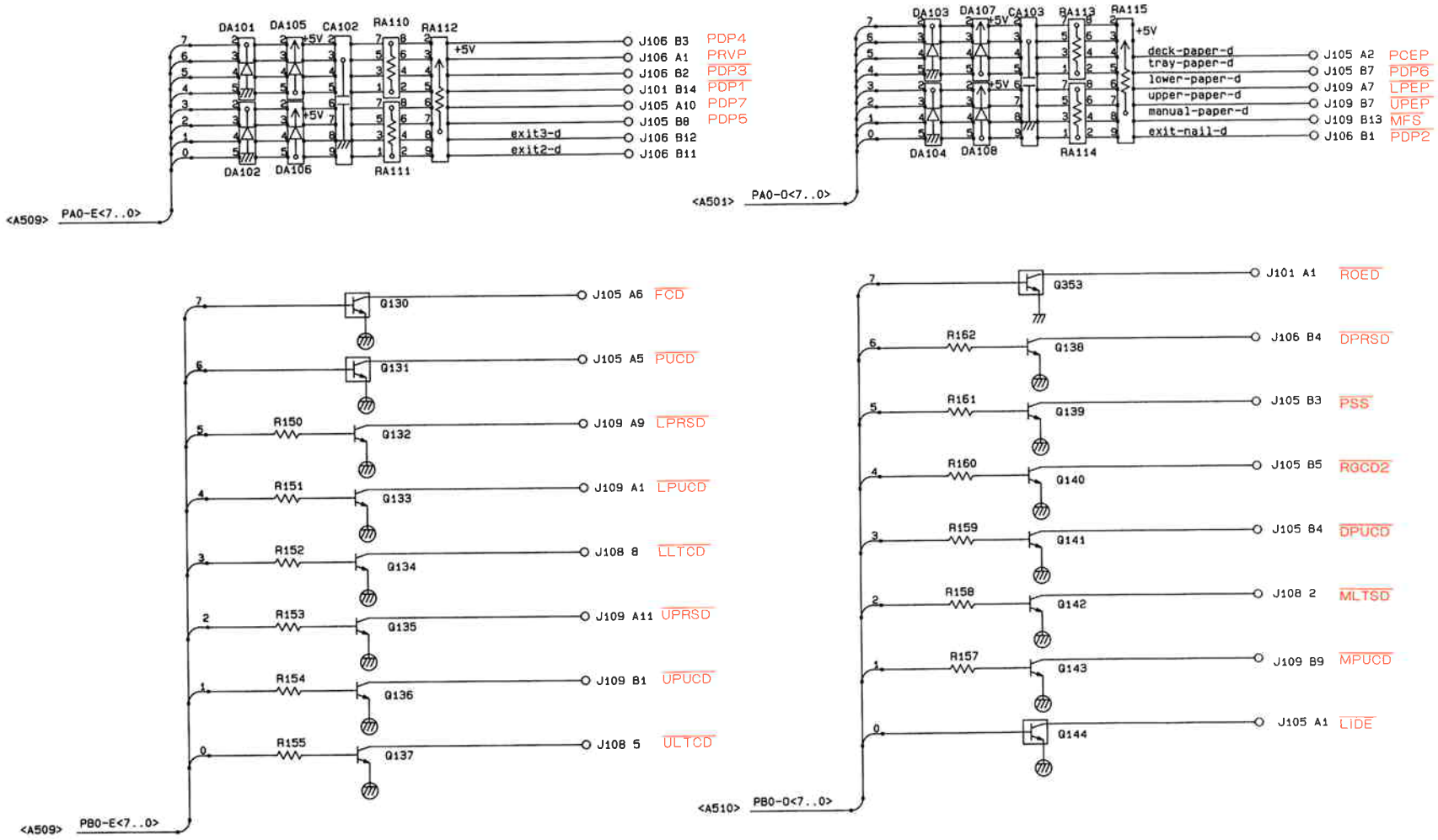

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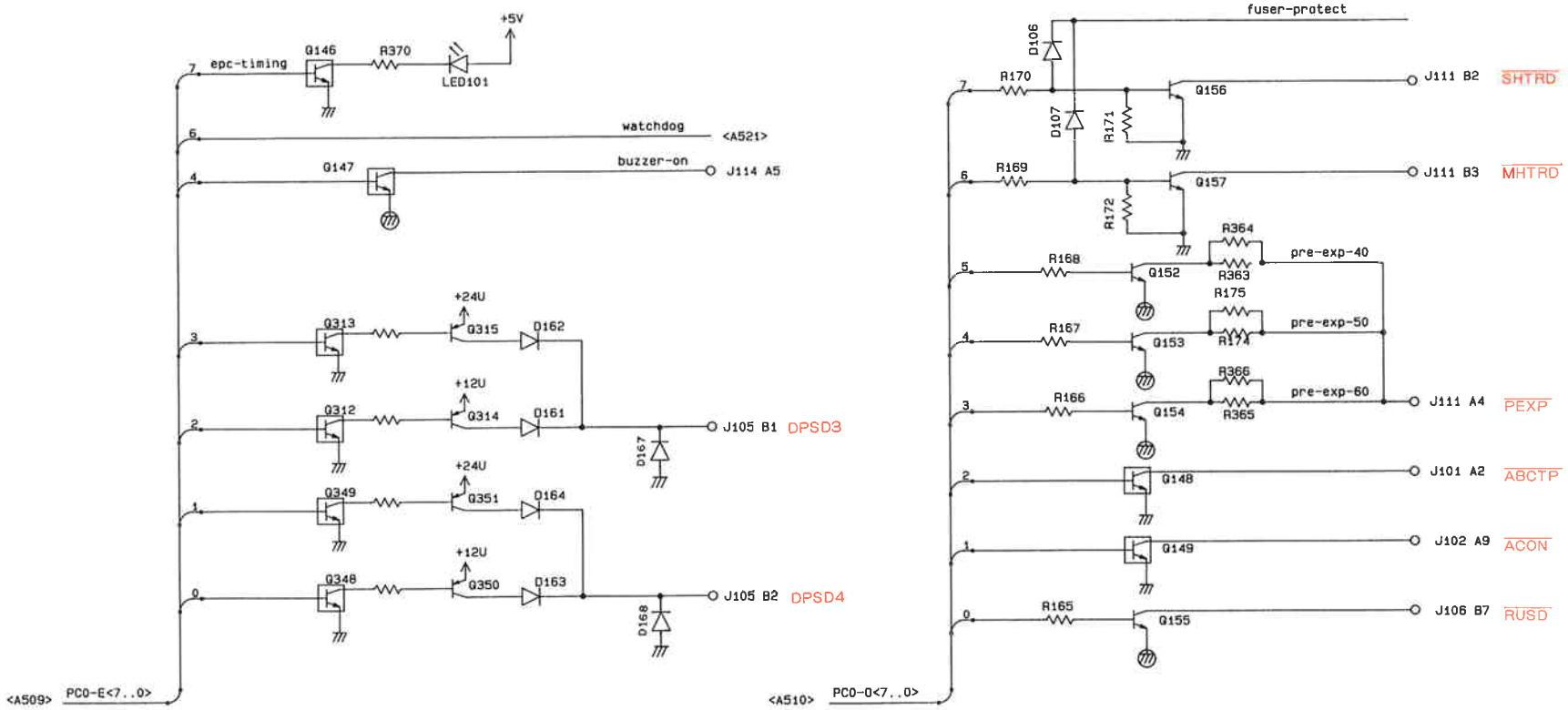

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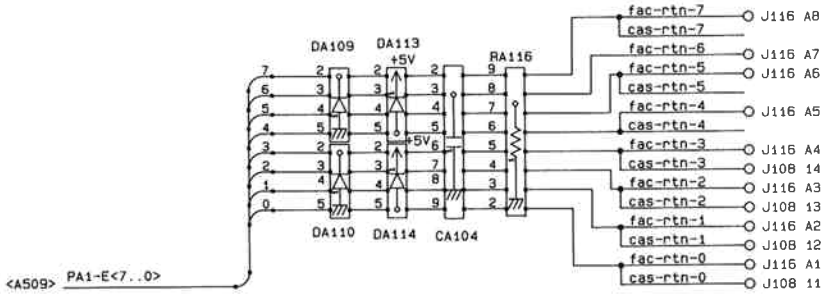

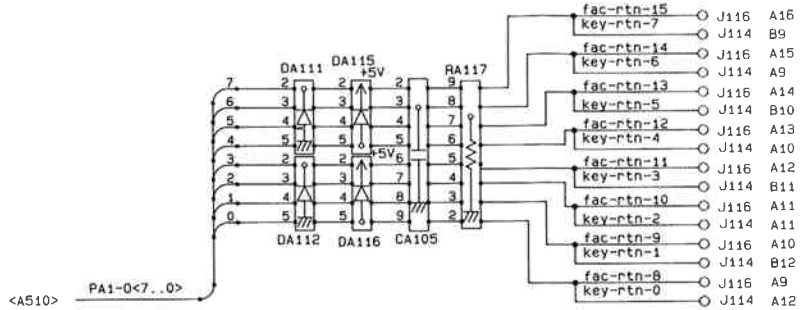

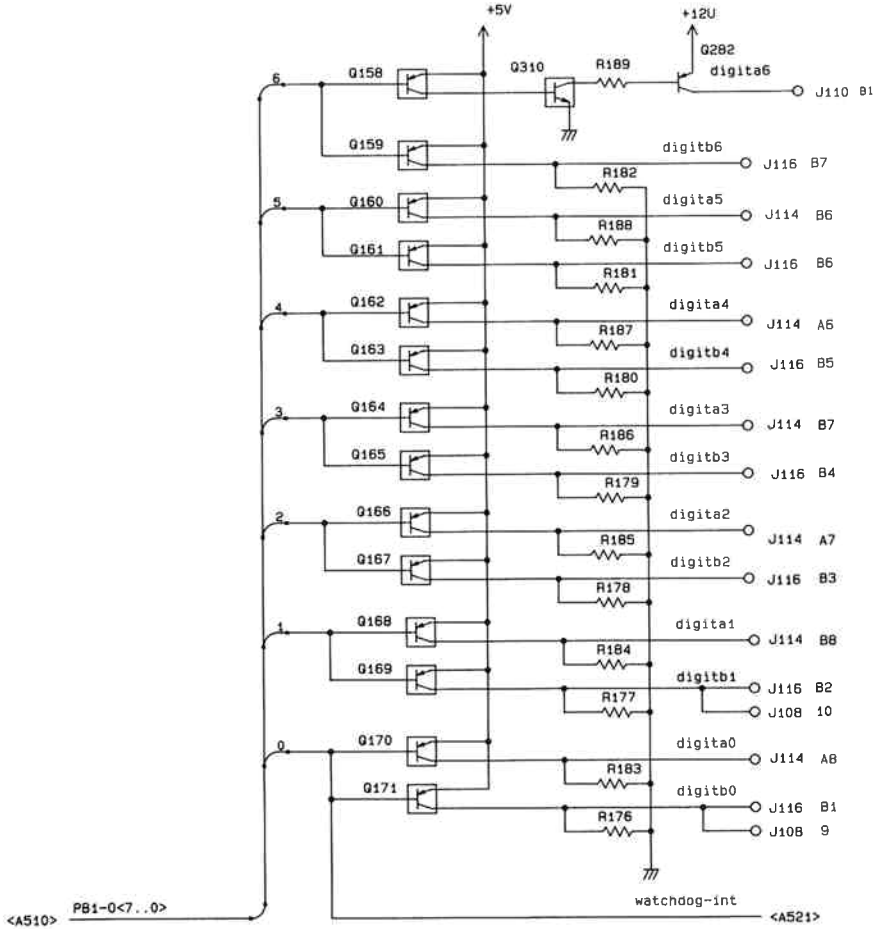

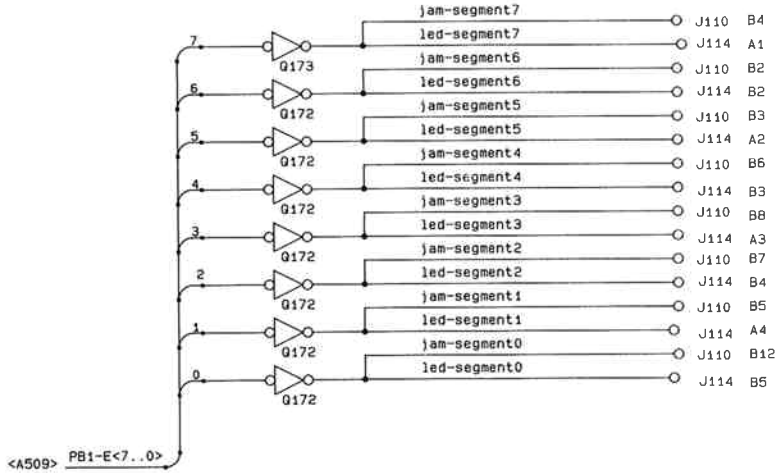

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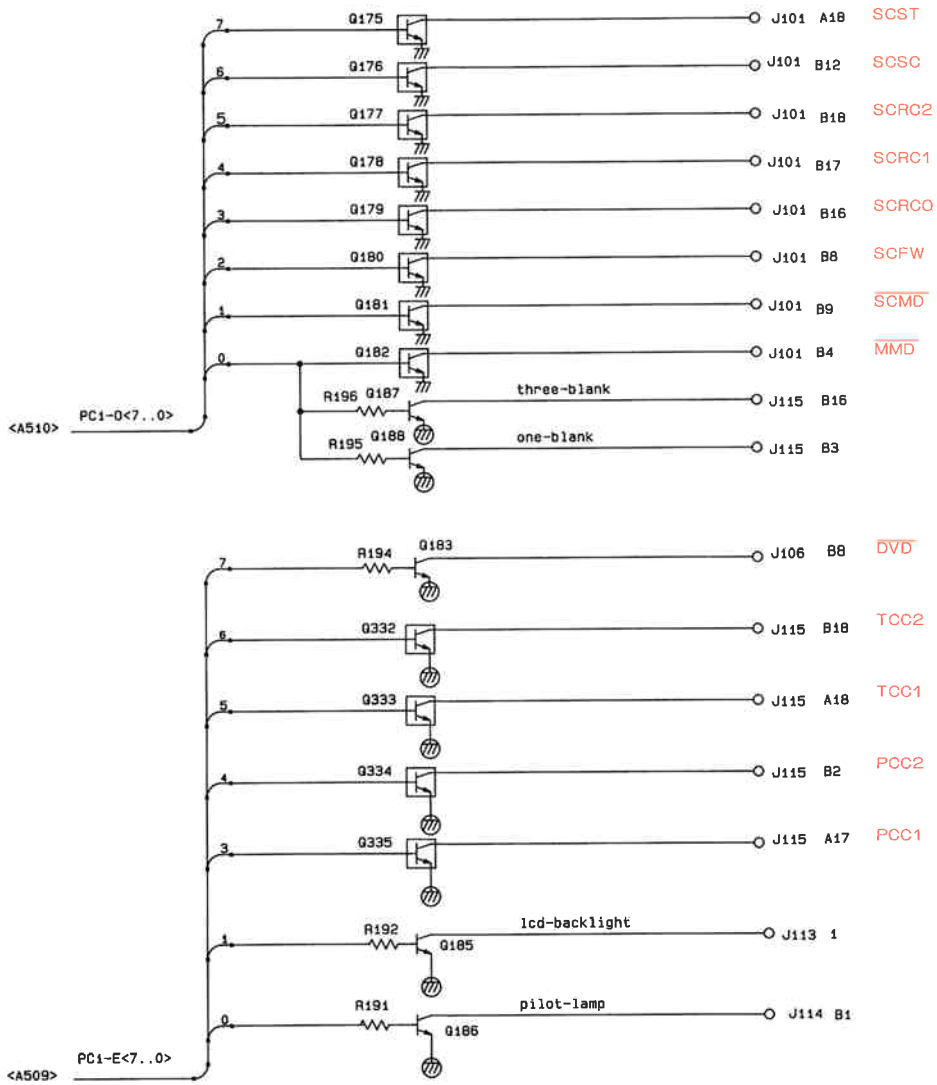

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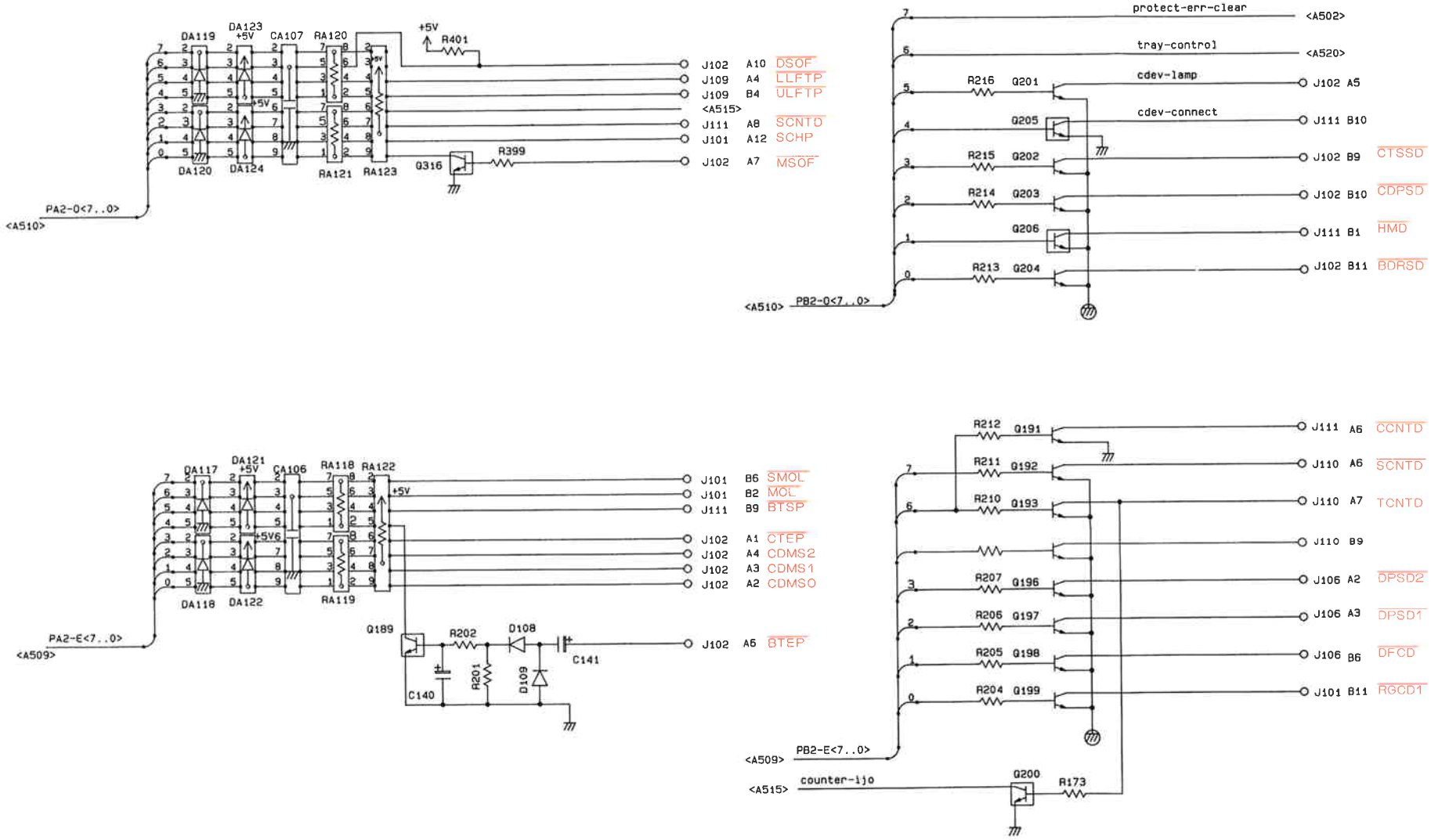

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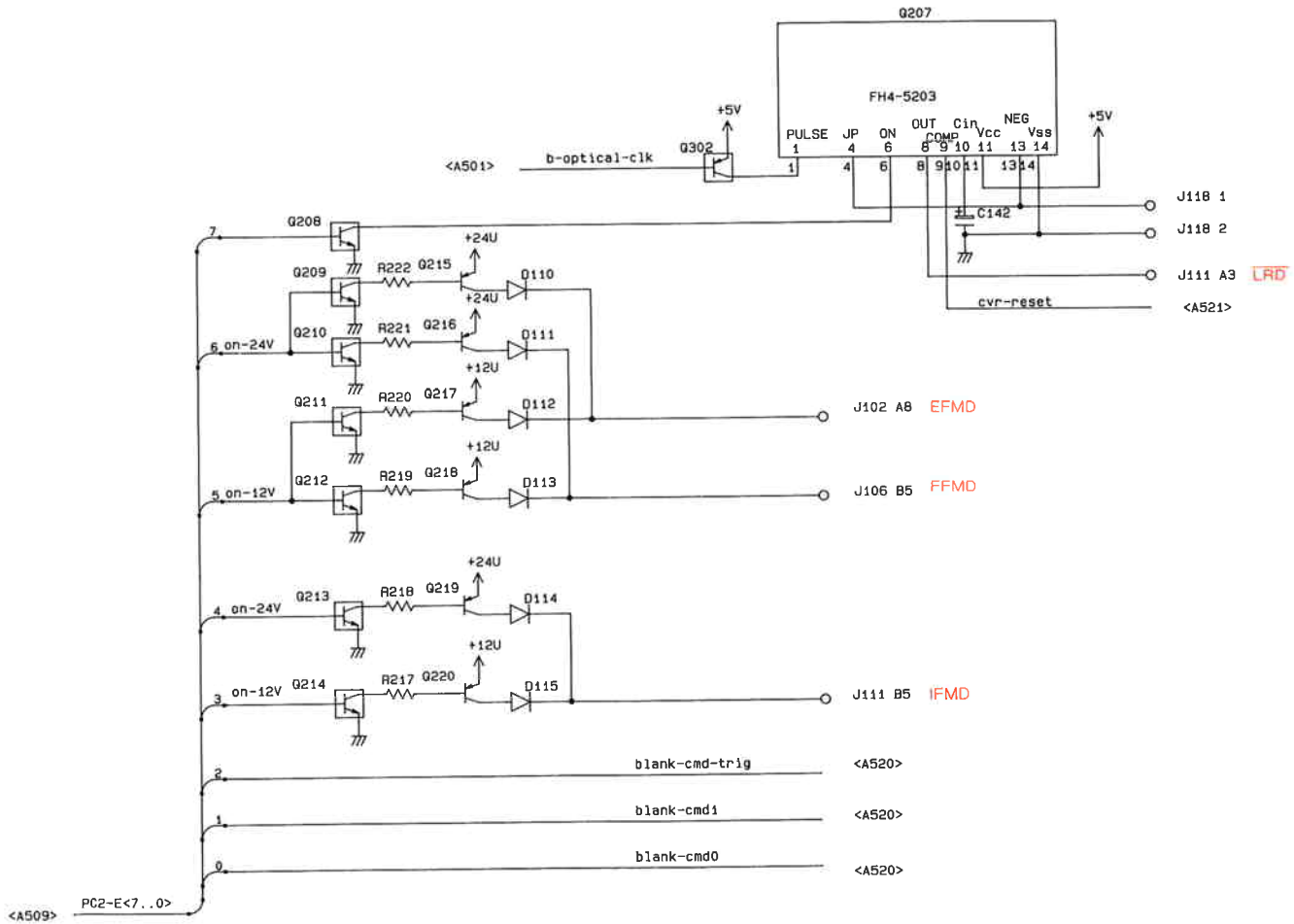

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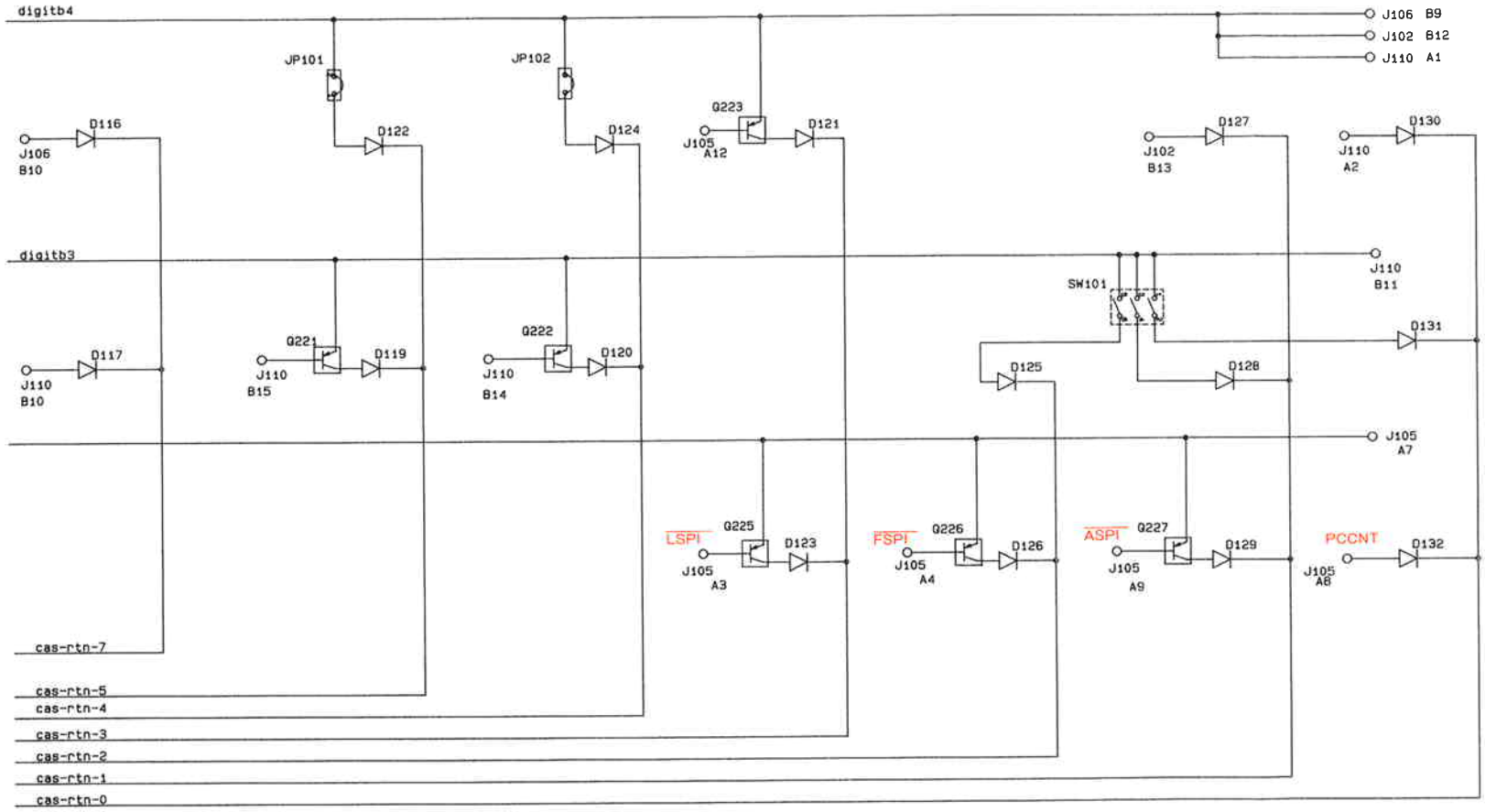

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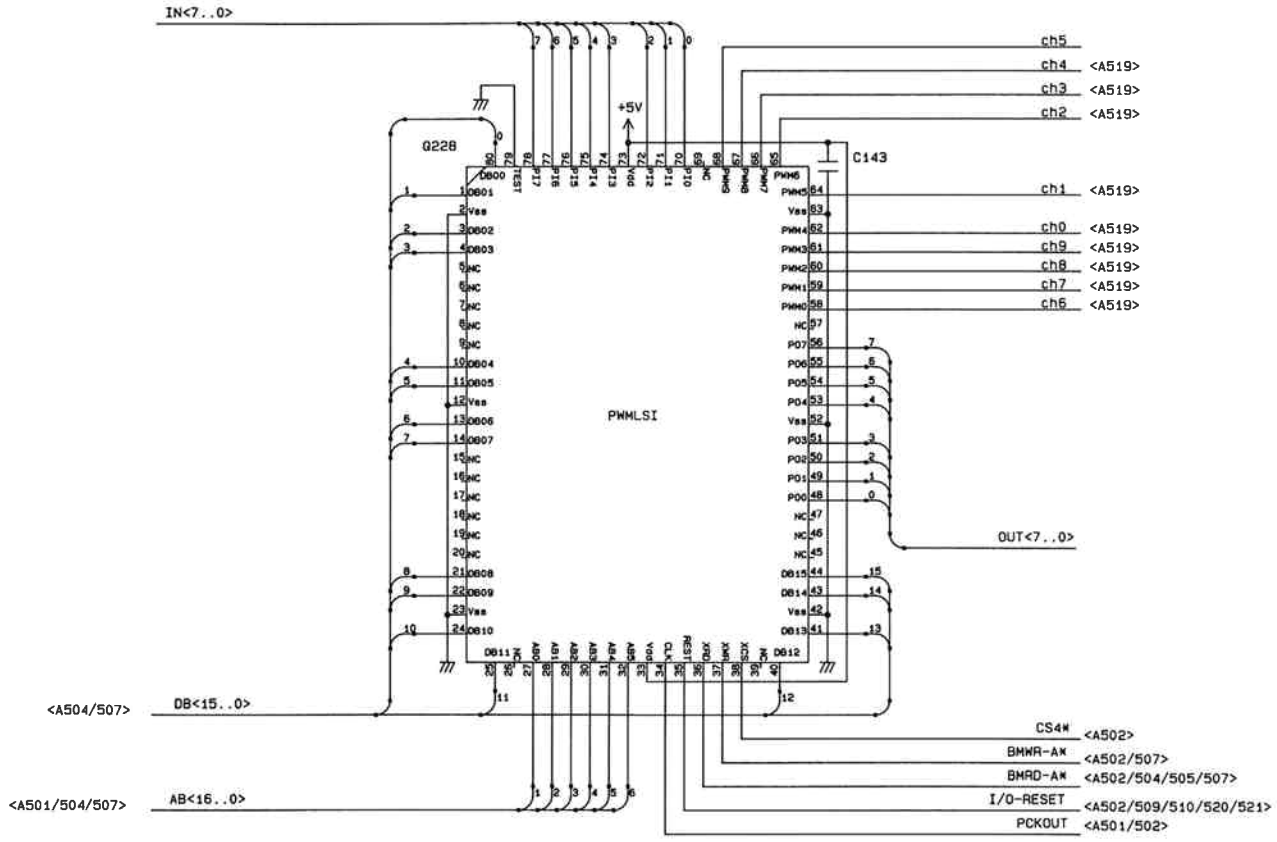

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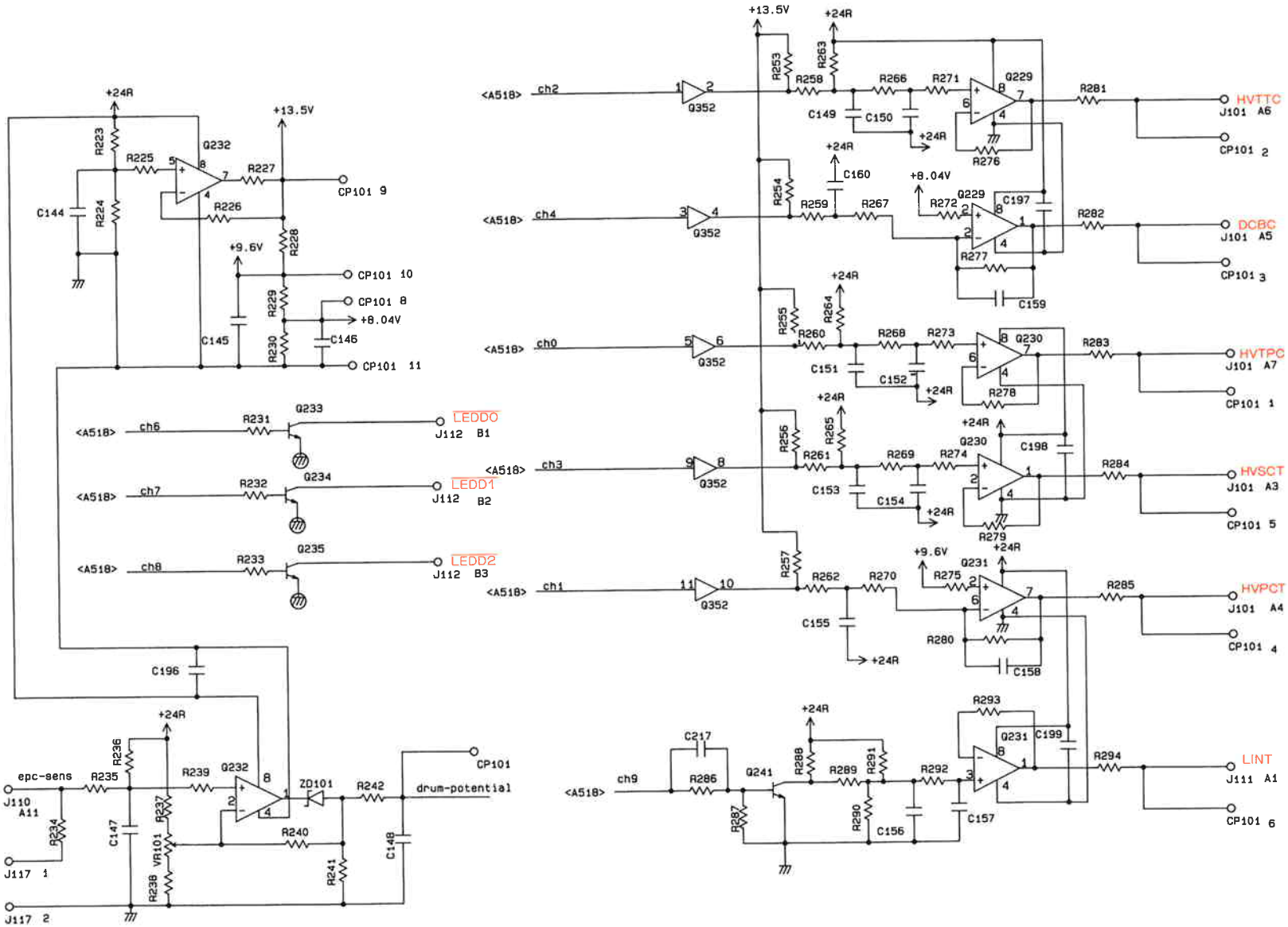

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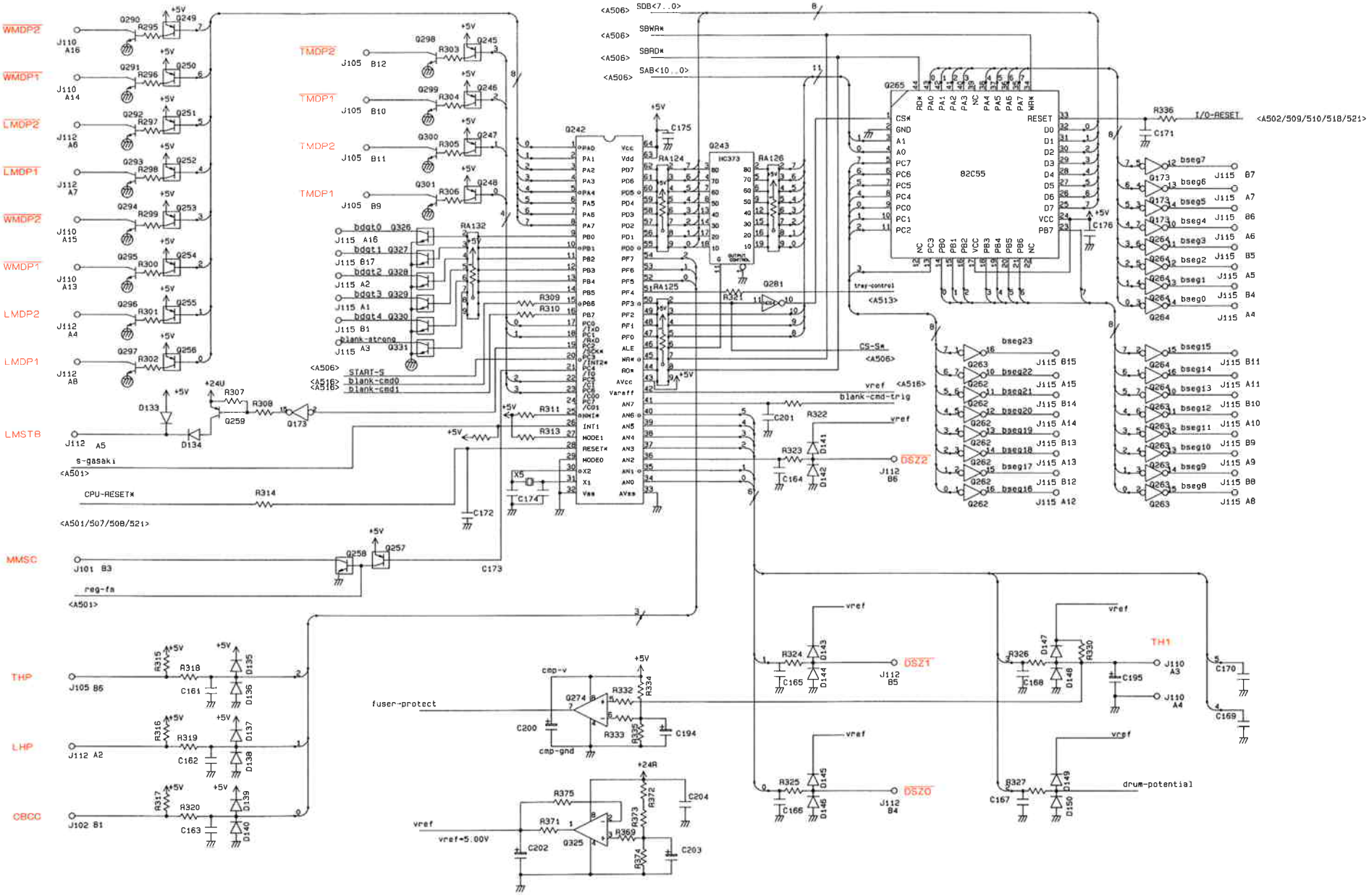
DC controller PCB (20/22 : A 520) Slave



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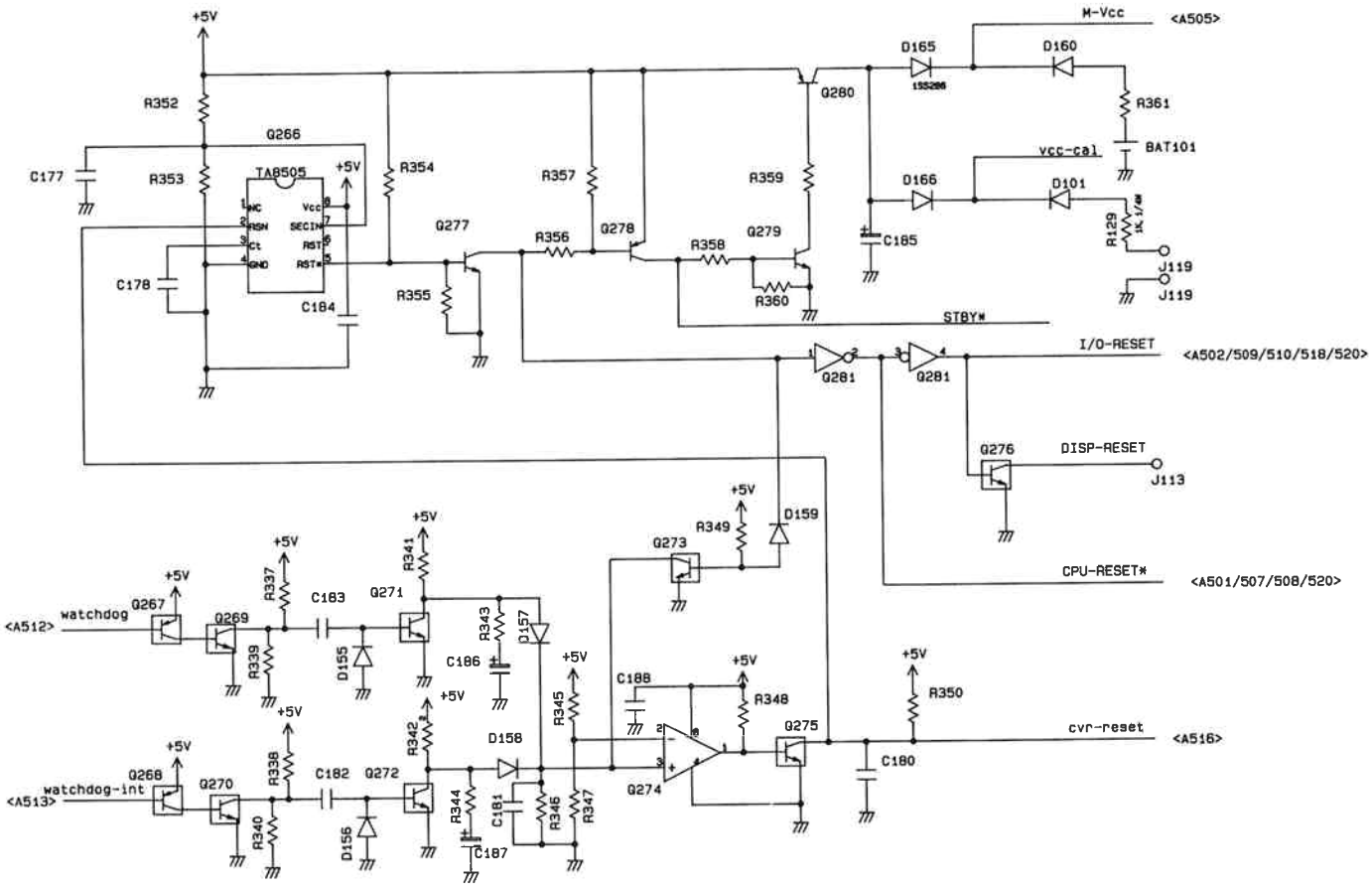

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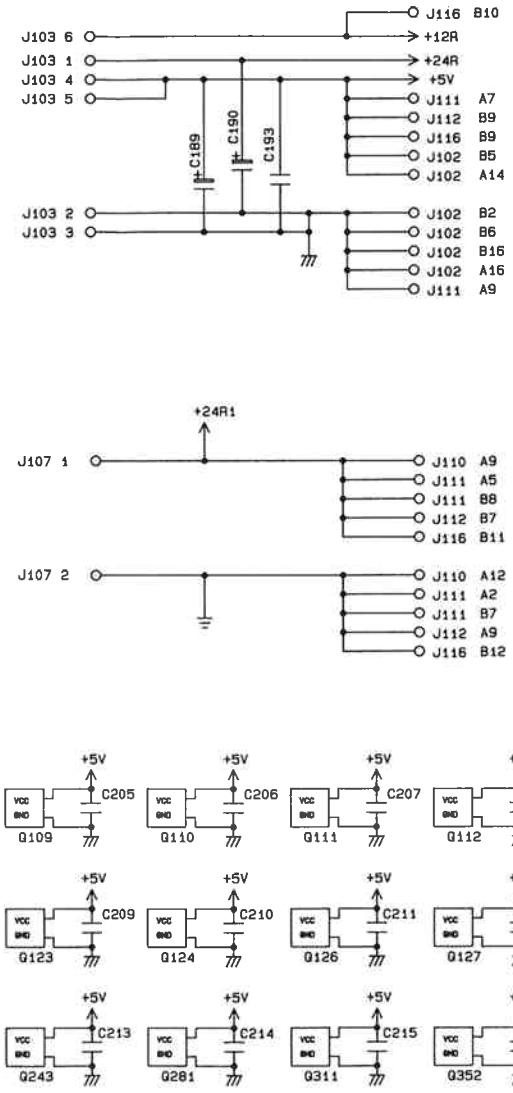

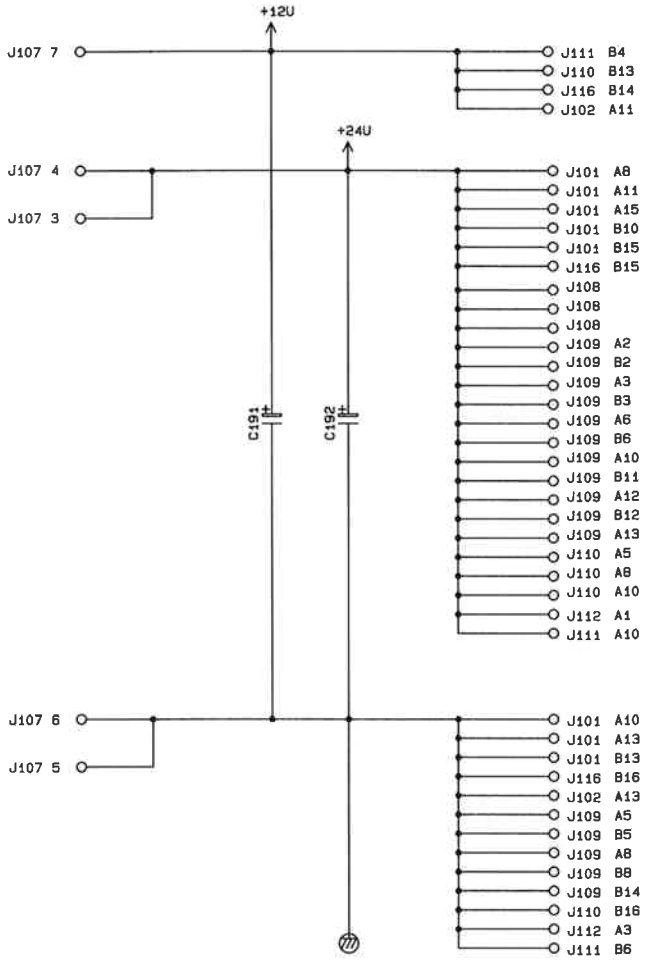

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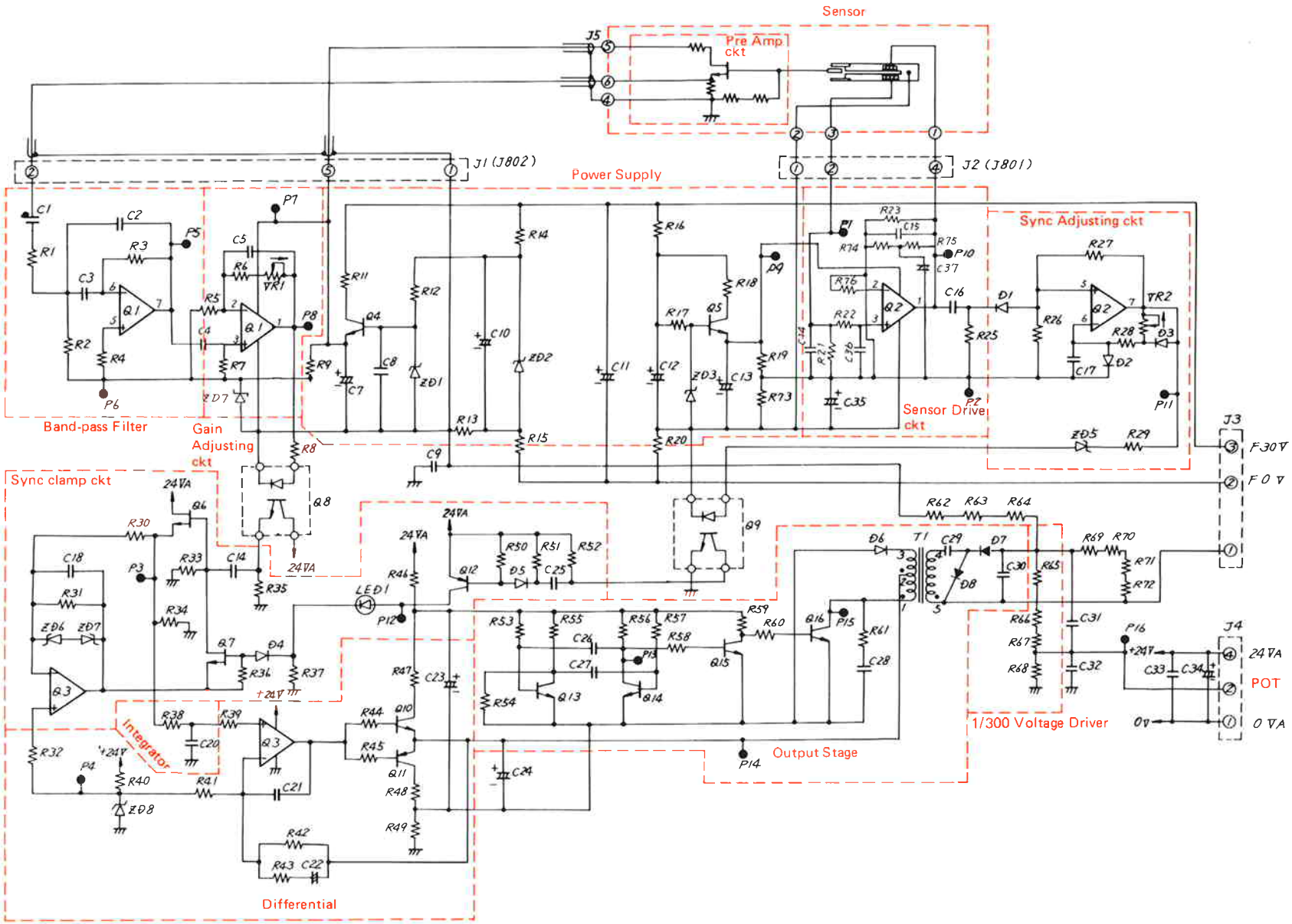

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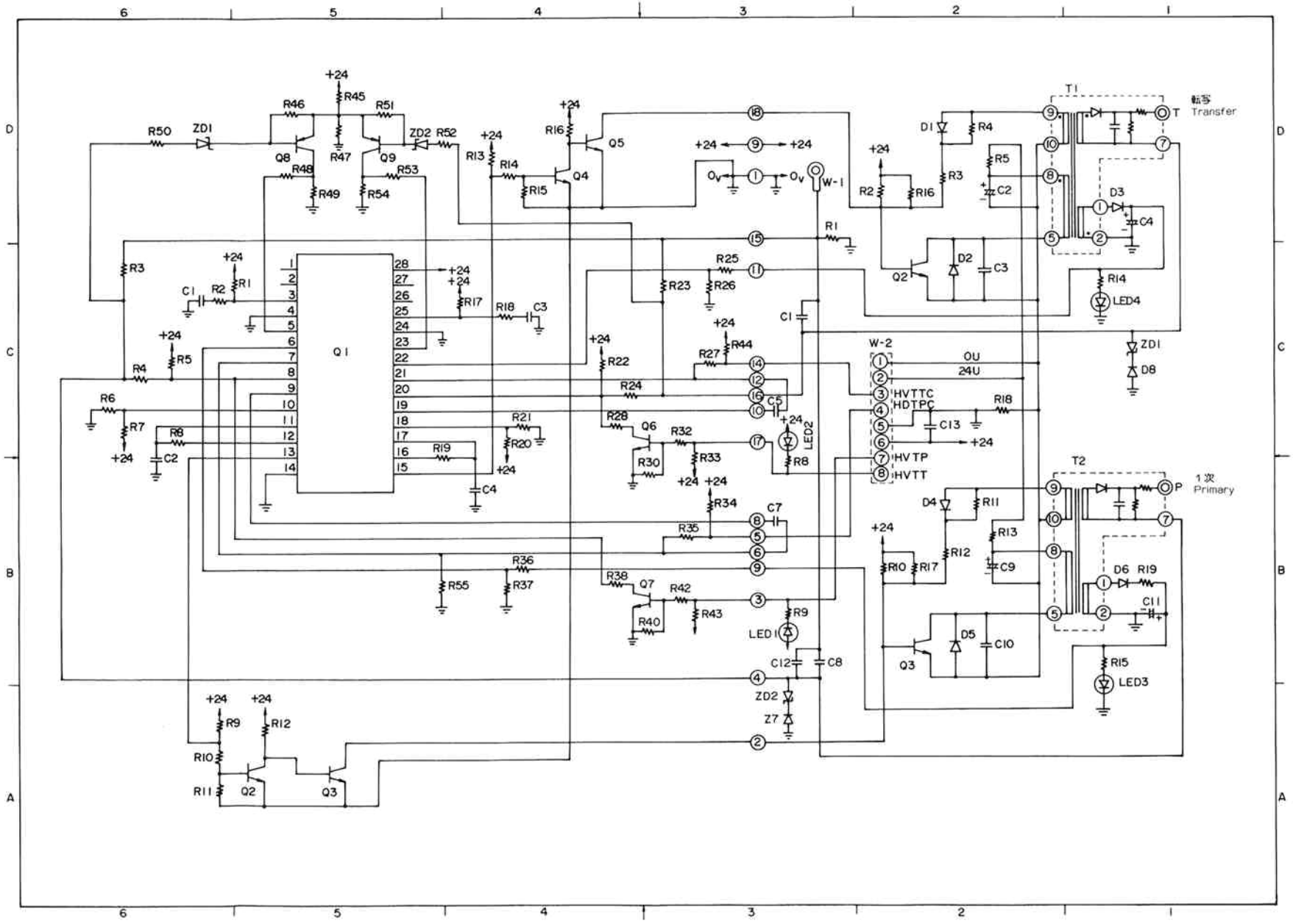
F. HIGH-VOLTAGE TRANSFORMER 1 DIAGRAM



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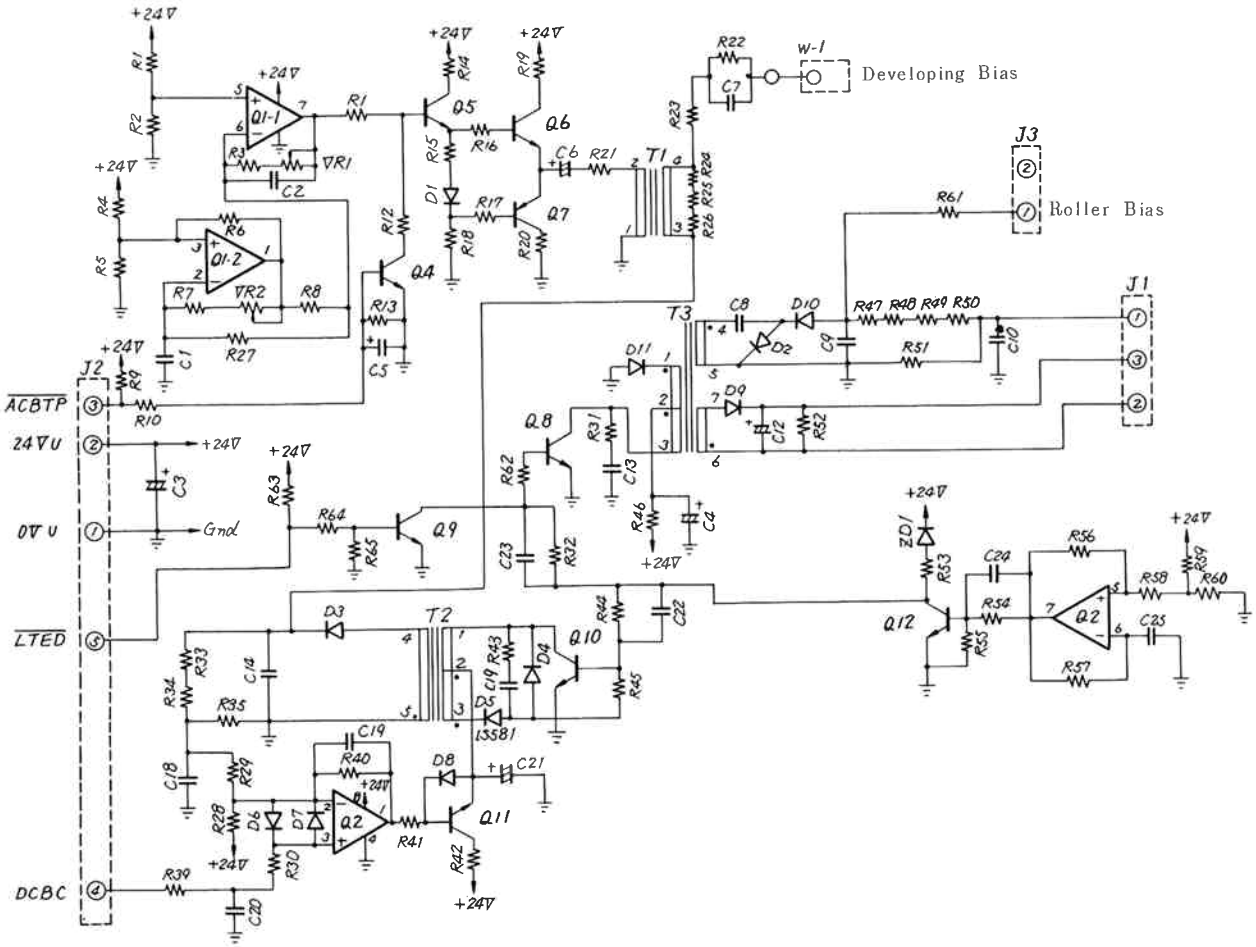

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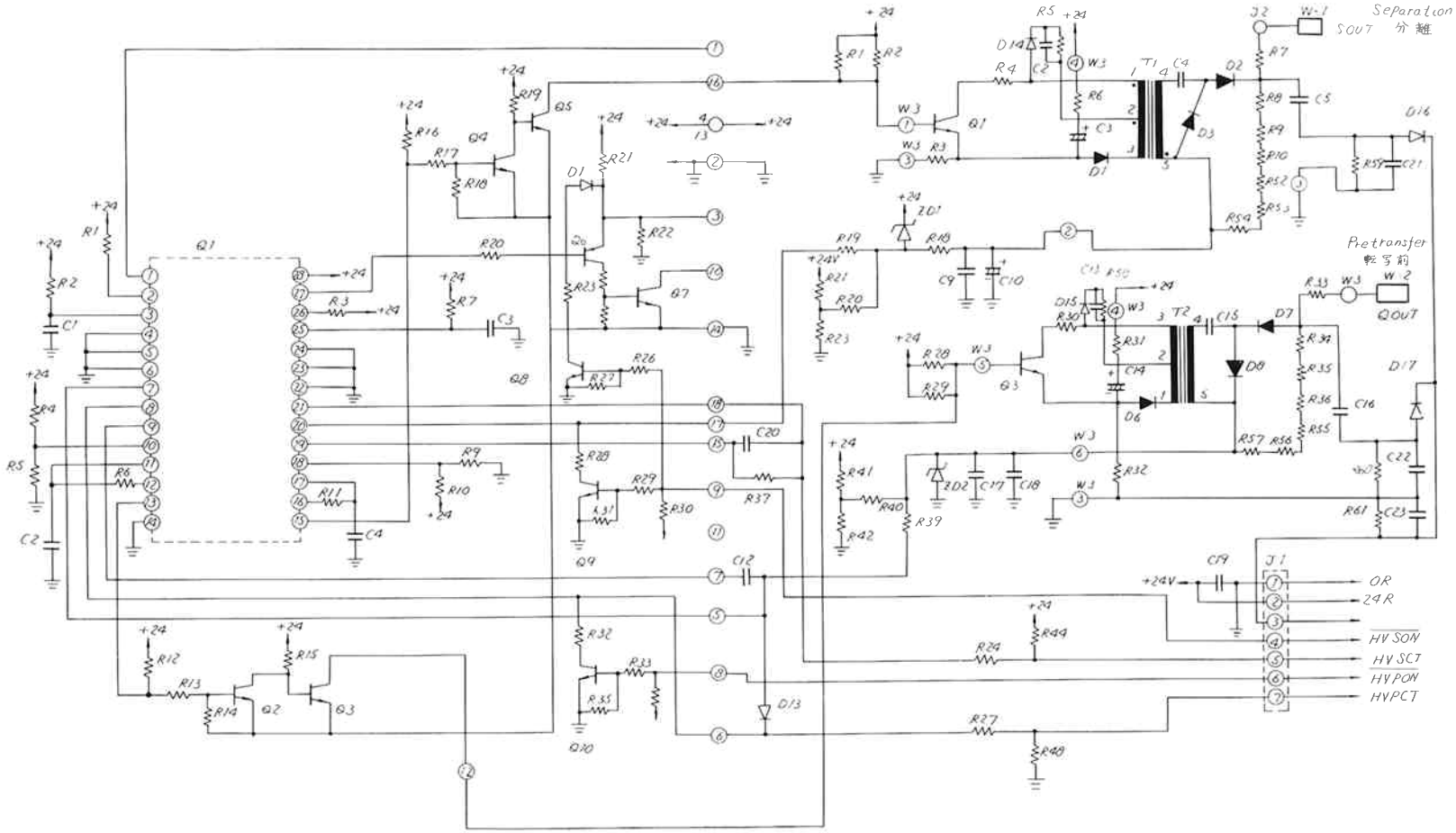
H. HIGH-VOLTAGE AC CONTROL DIAGRAM



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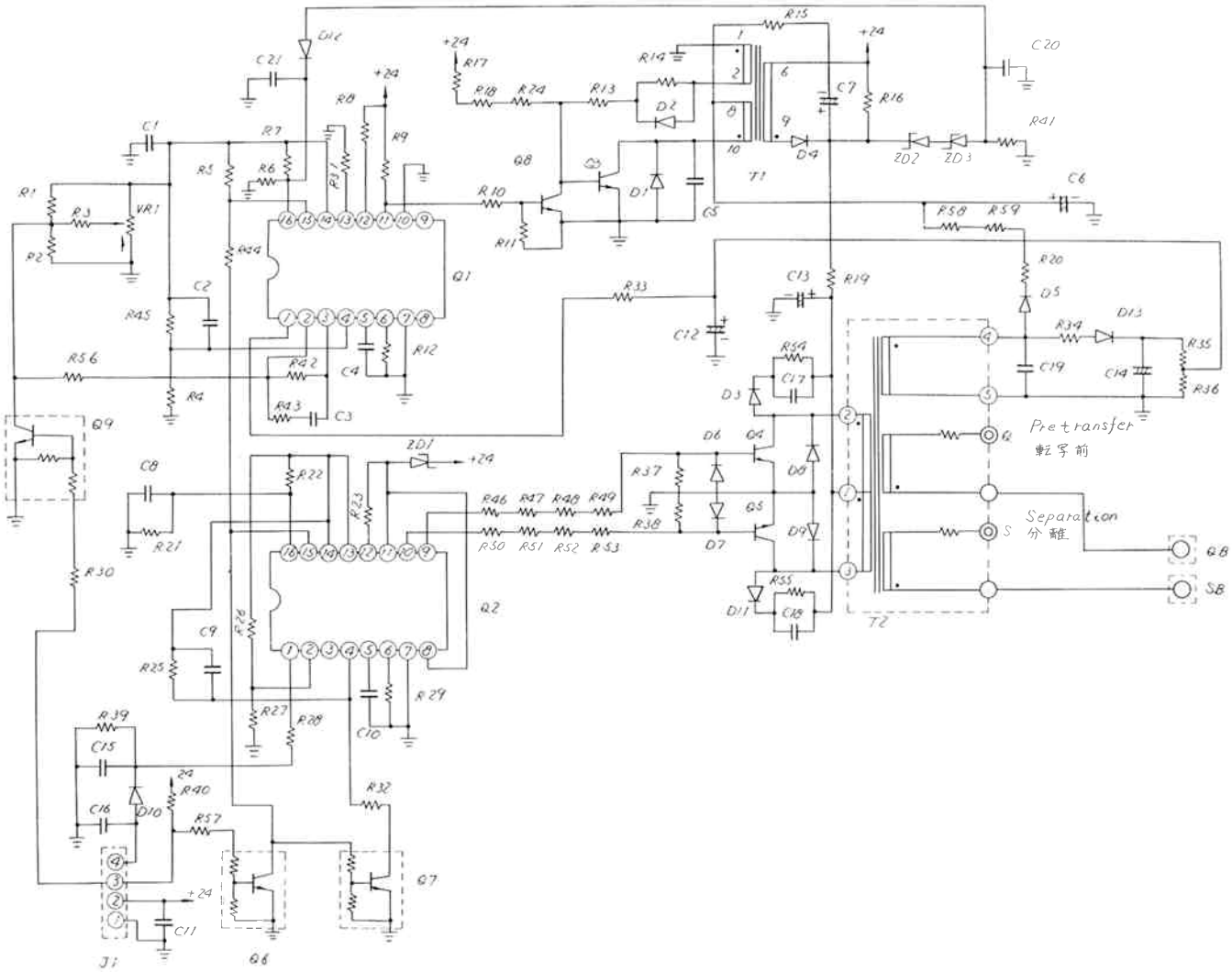

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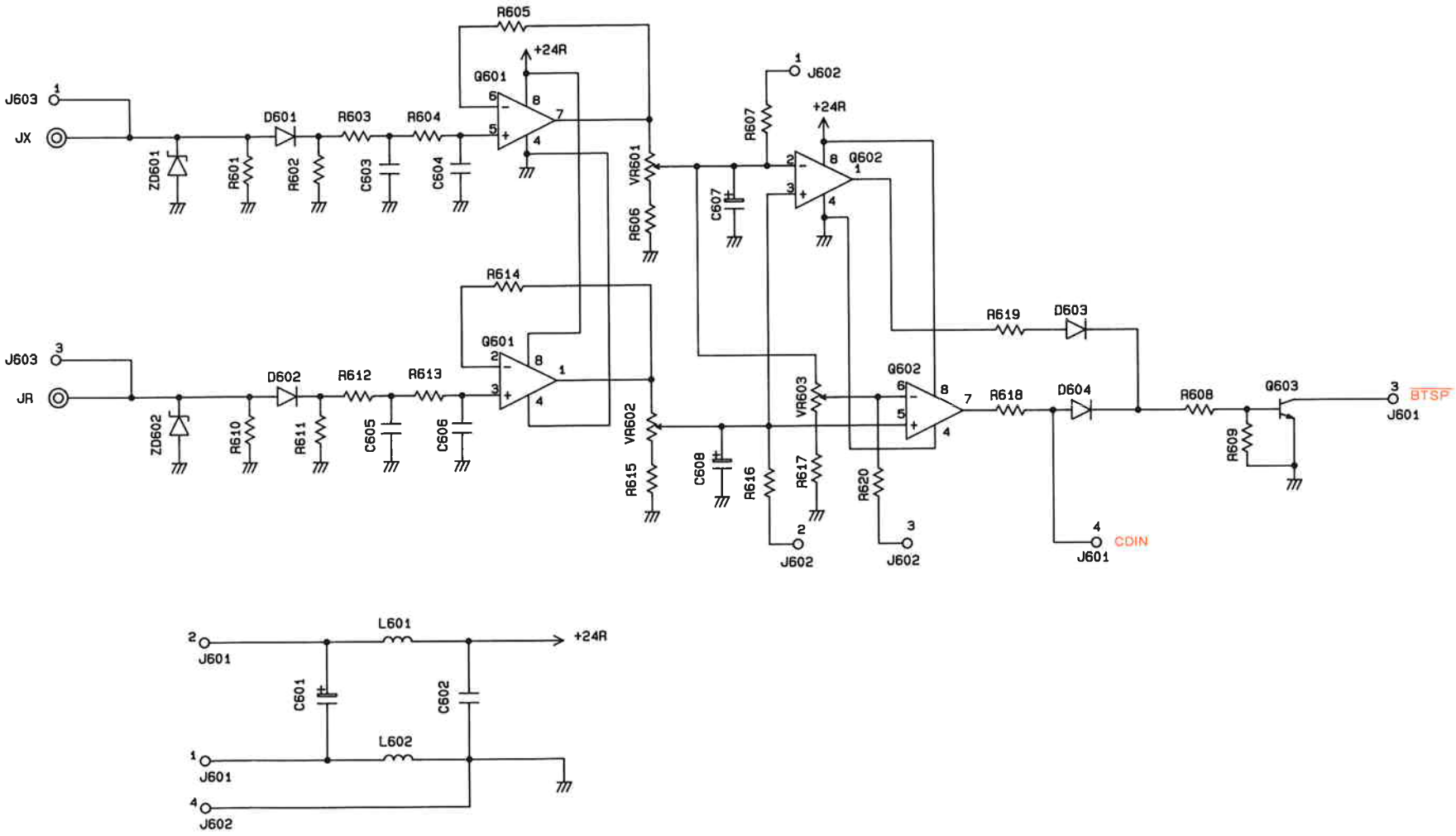
J. BLACK TONER LEVEL CIRCUIT DIAGRAM



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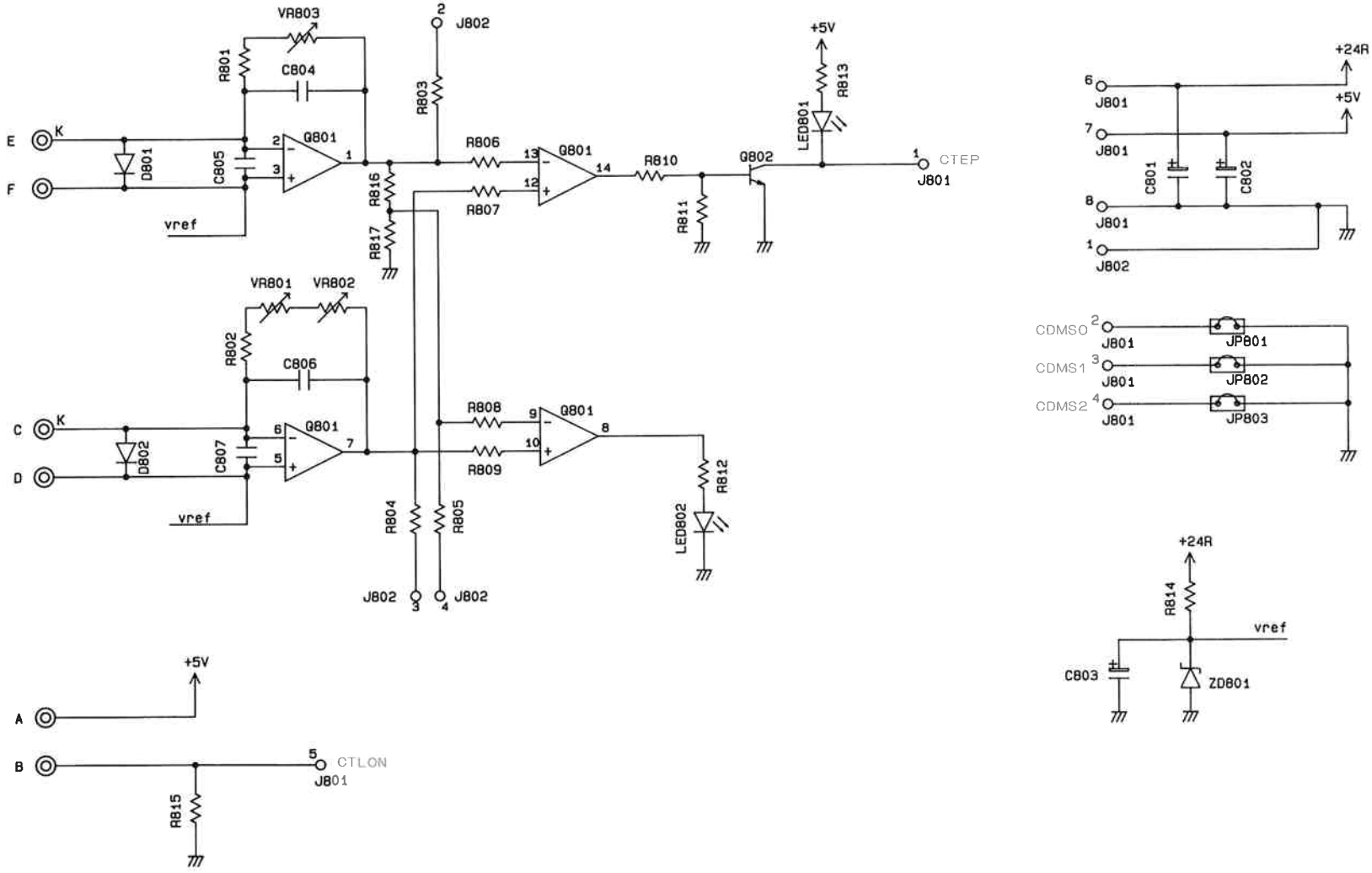

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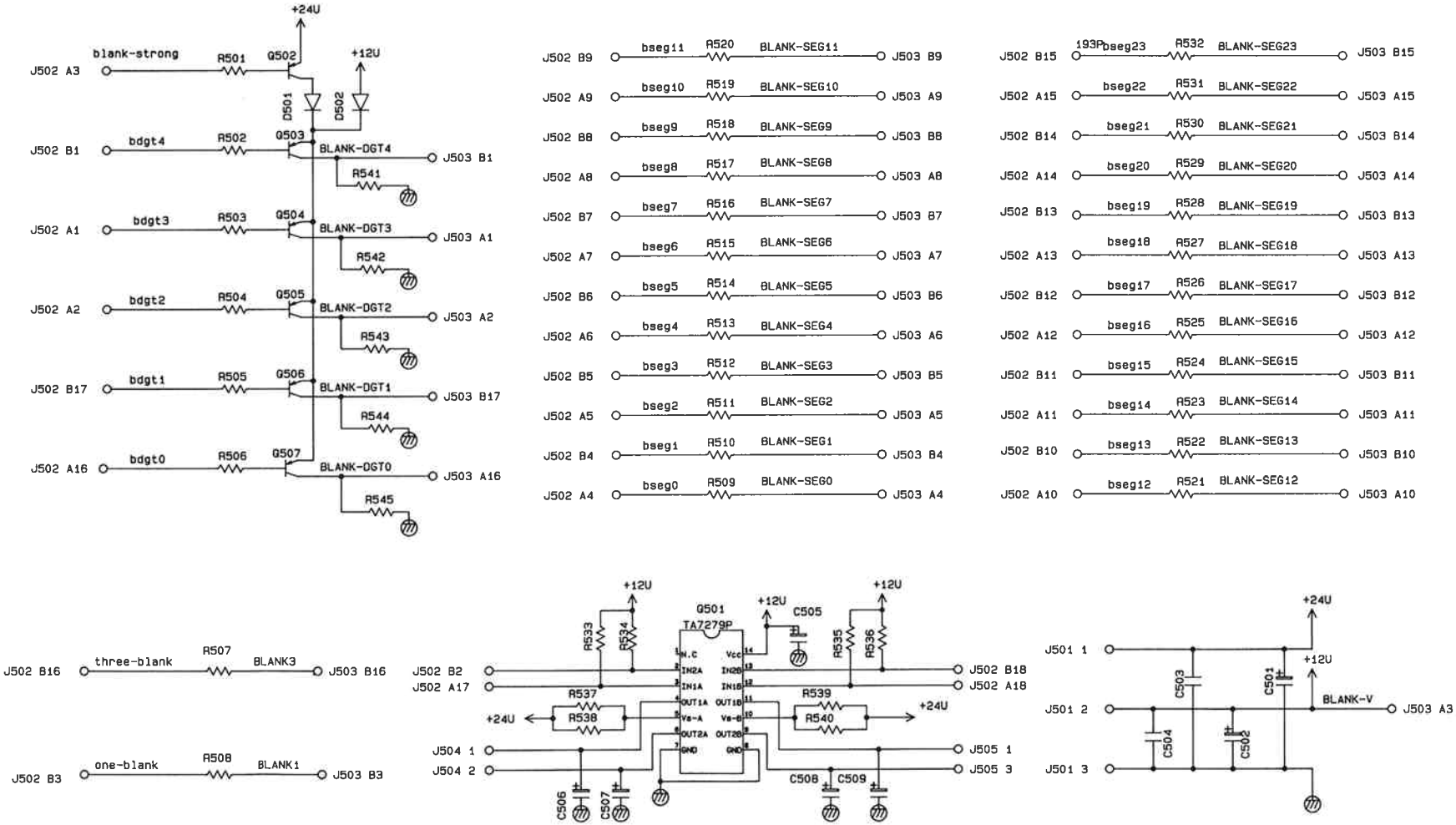
L. BLANK/CONNECTOR DIAGRAM



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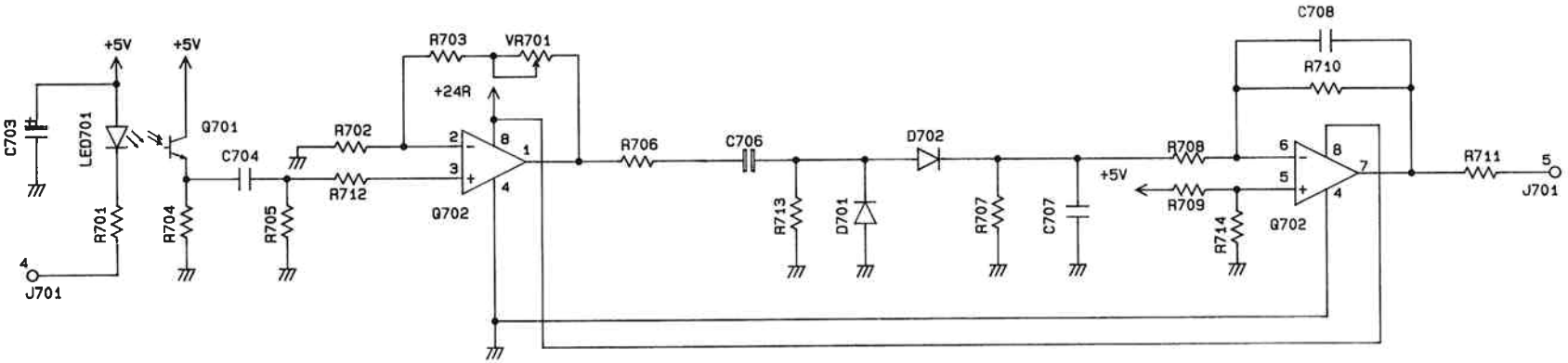

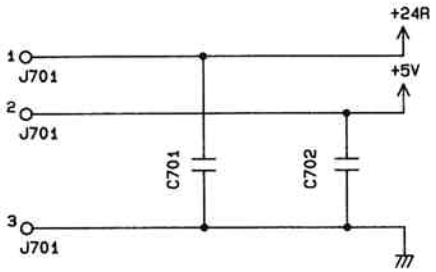

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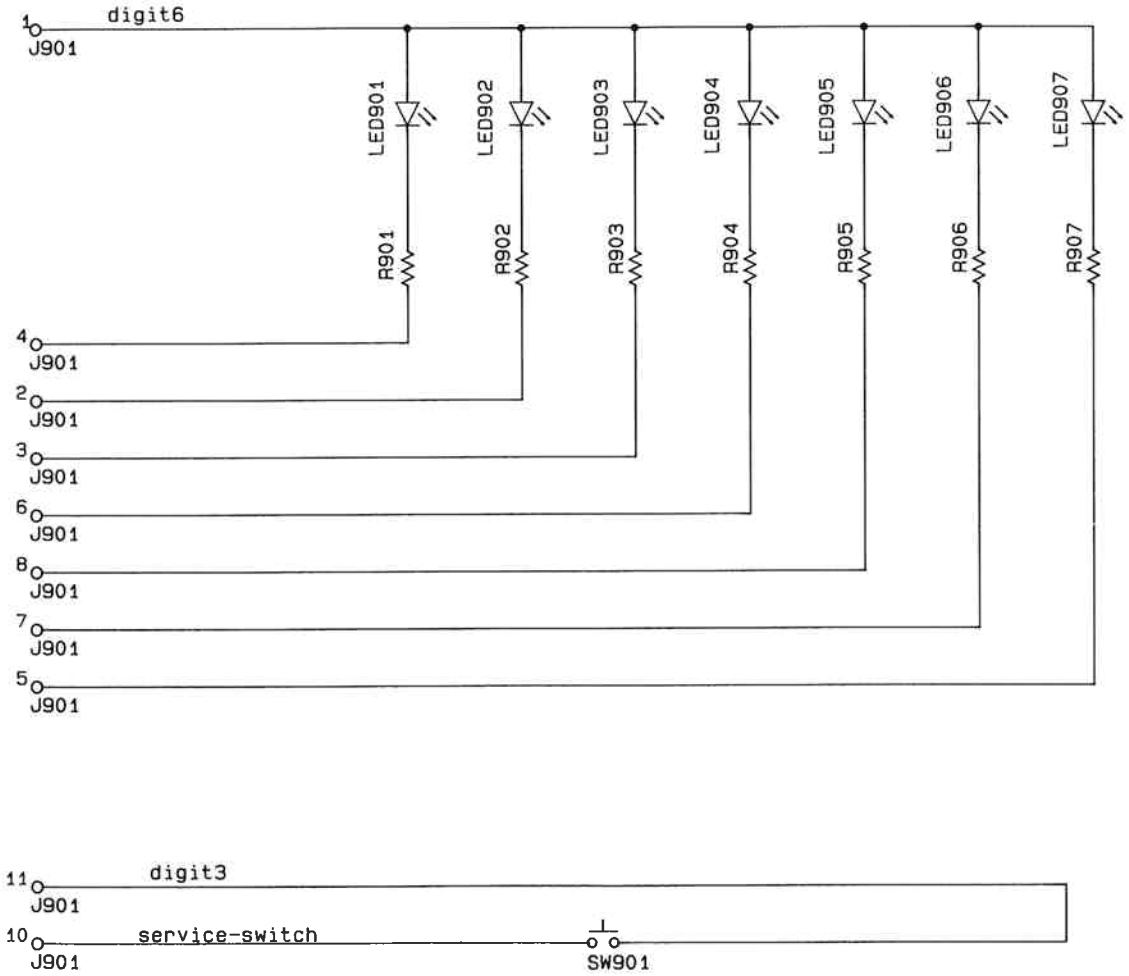
N. JAM INDICATOR CIRCUIT DIAGRAM



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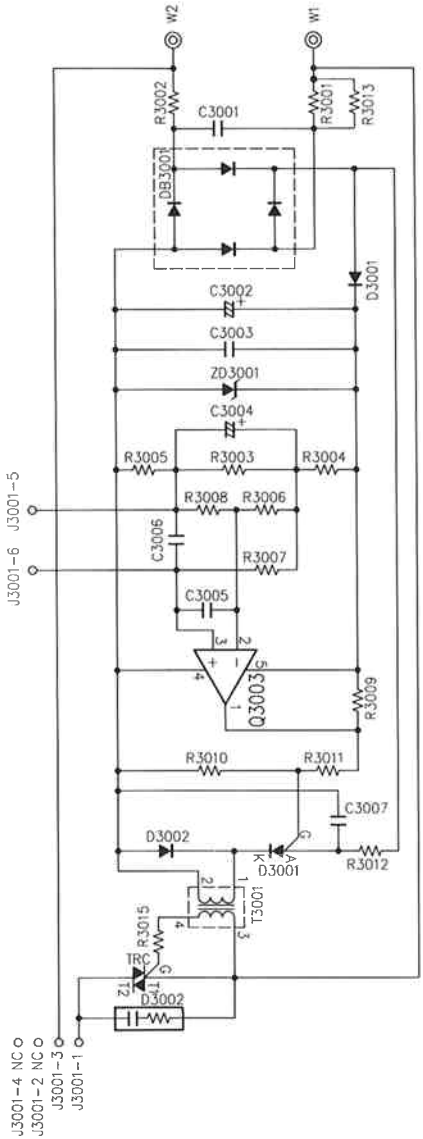
O. DRUM HEATER CONTROL CIRCUIT DIAGRAM



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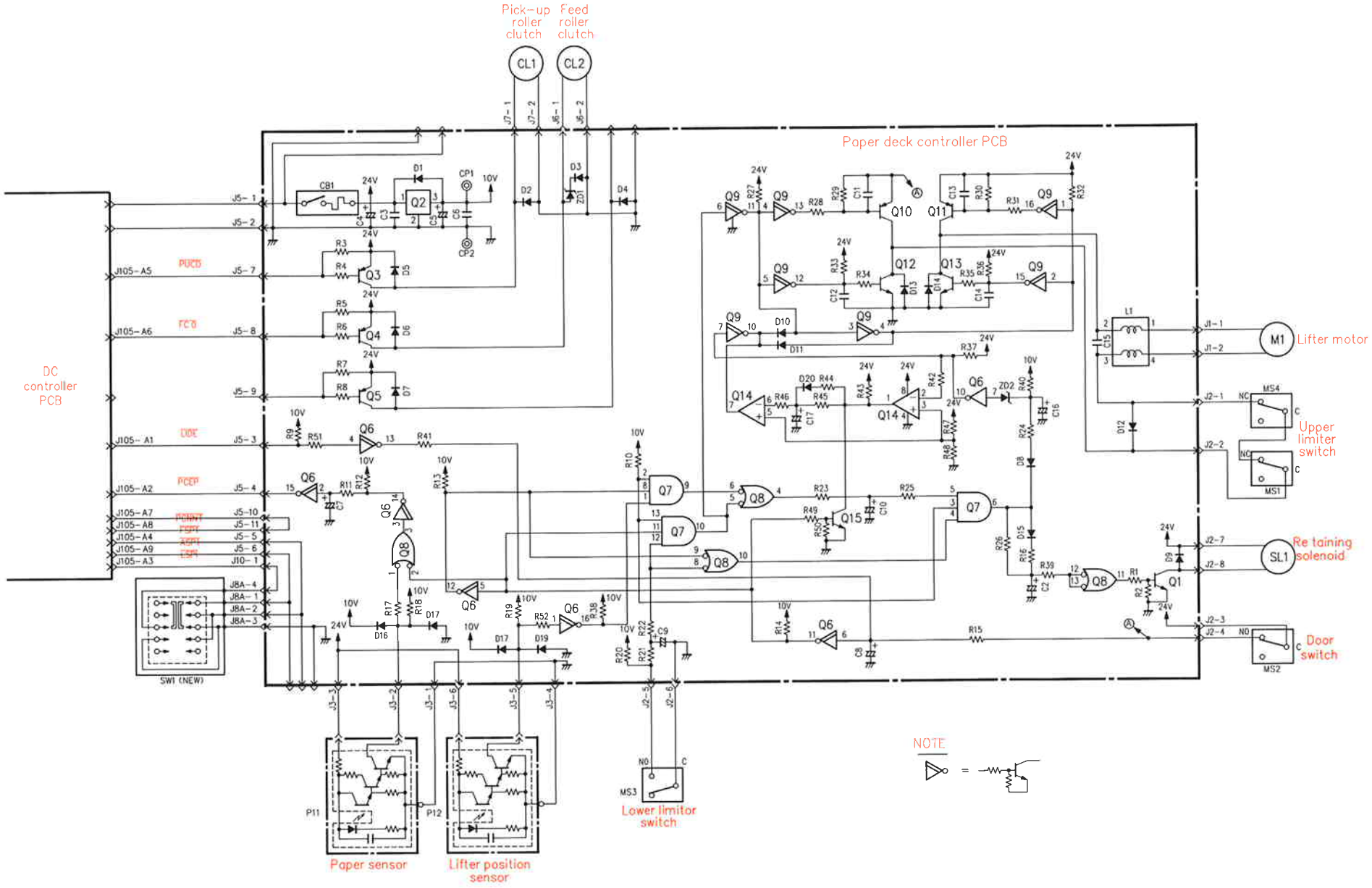

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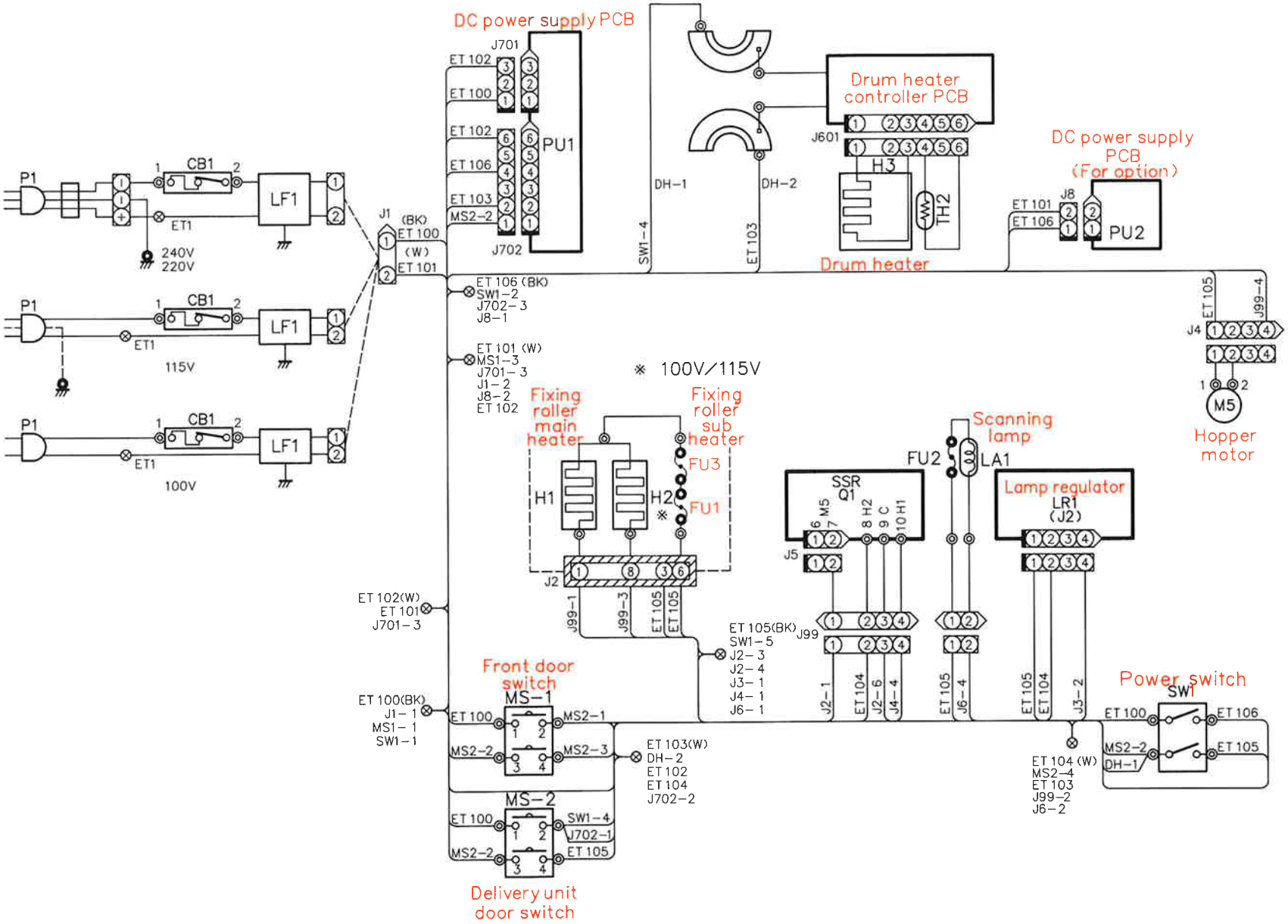
Q. WIRING DIAGRAM



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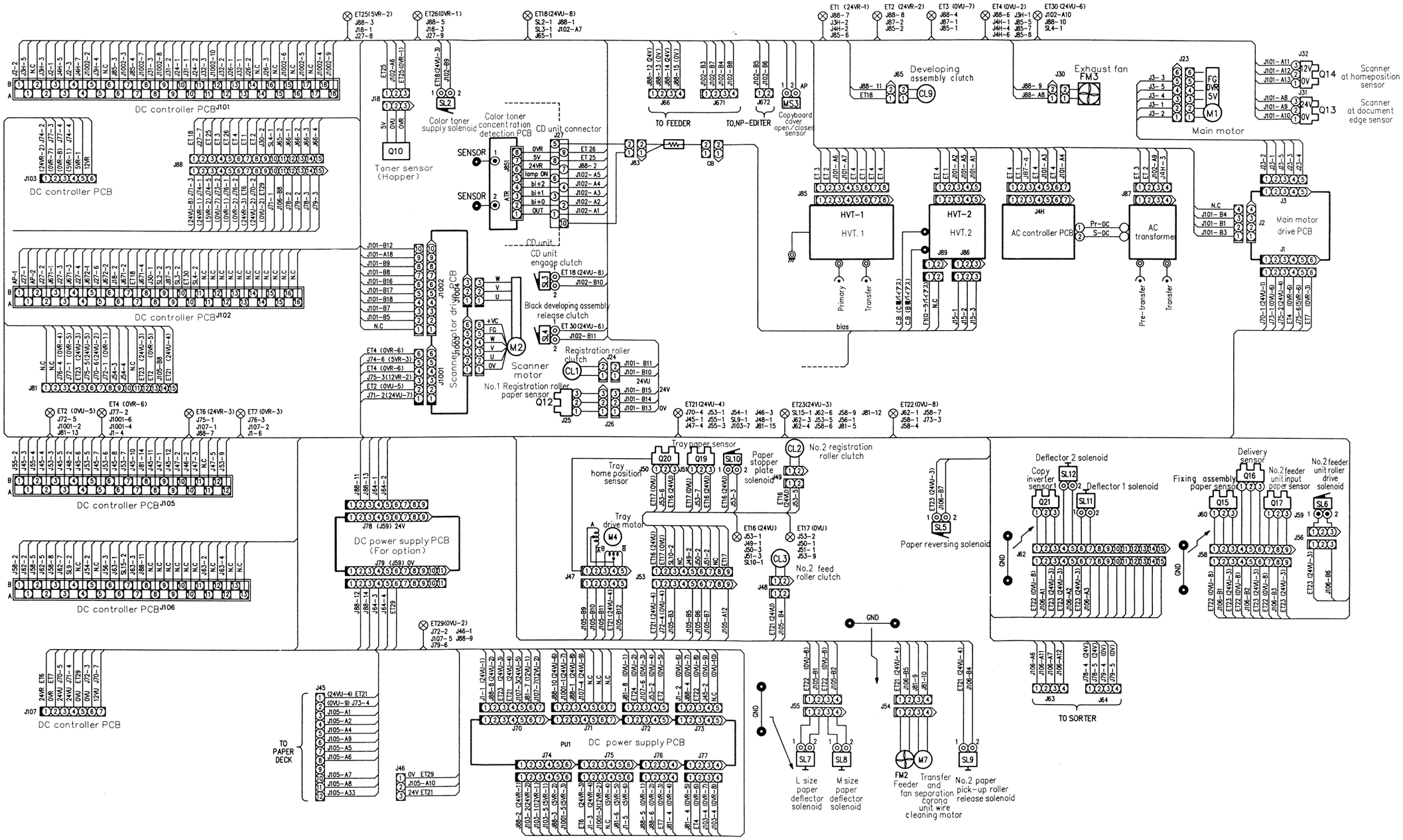

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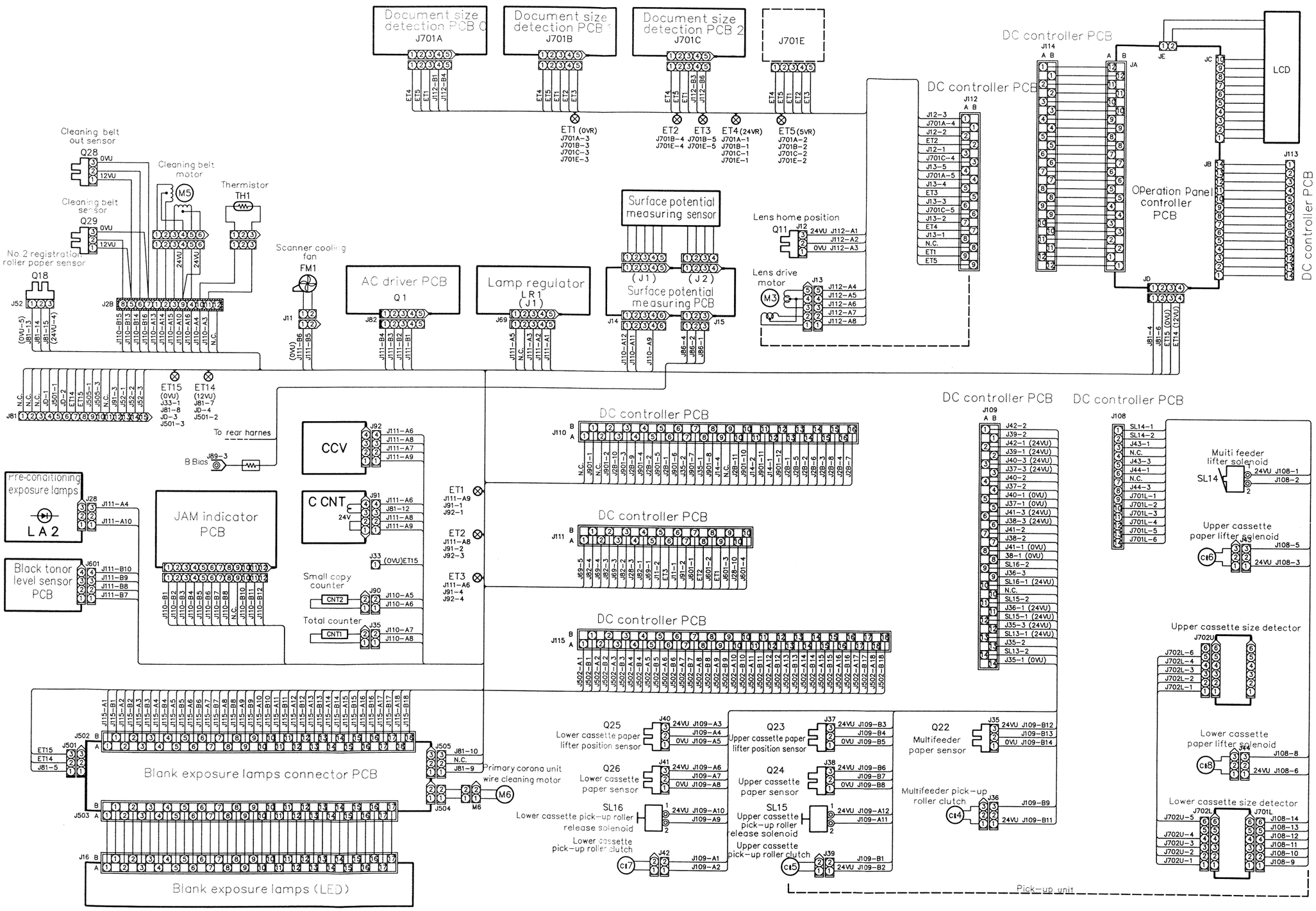

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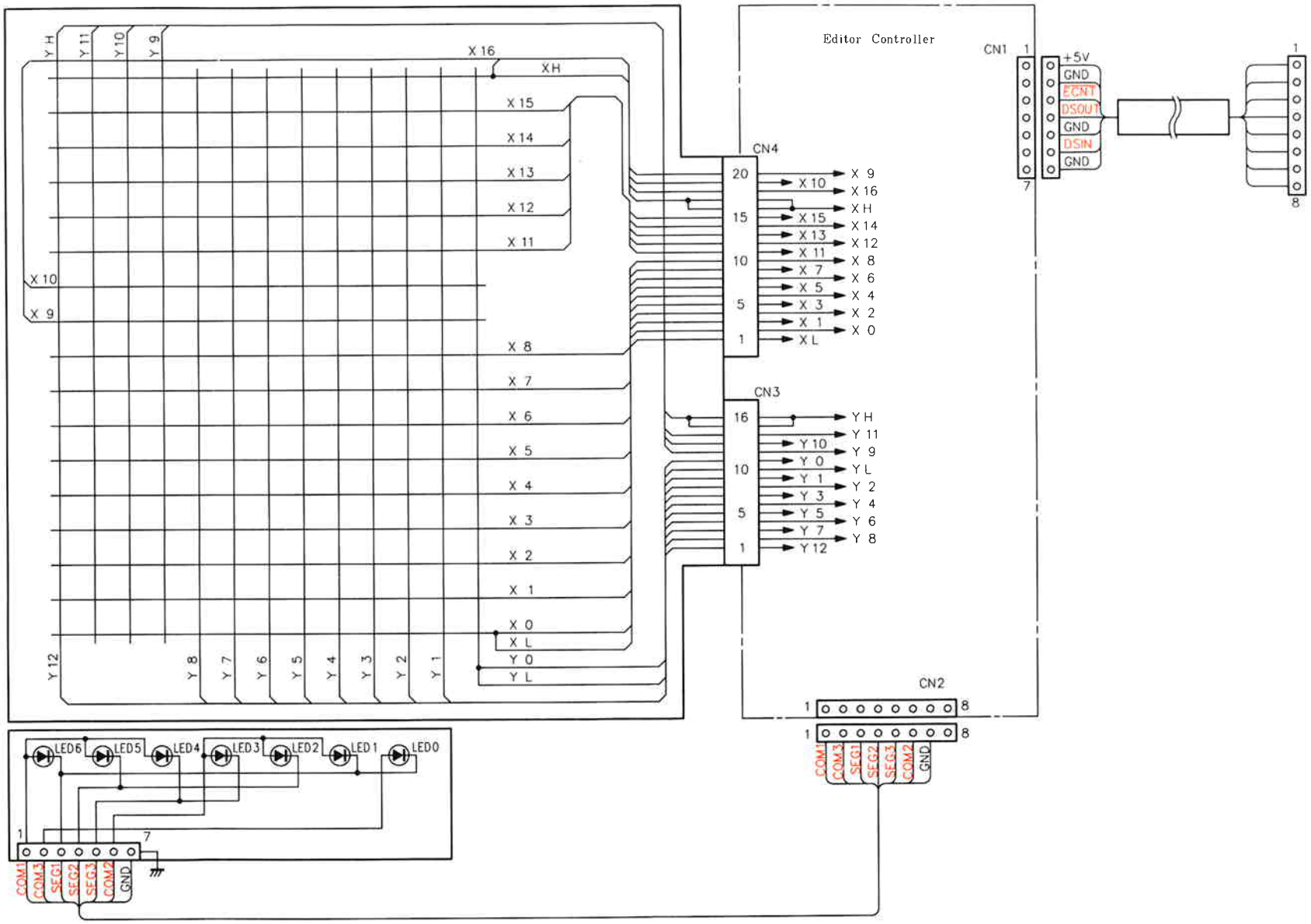

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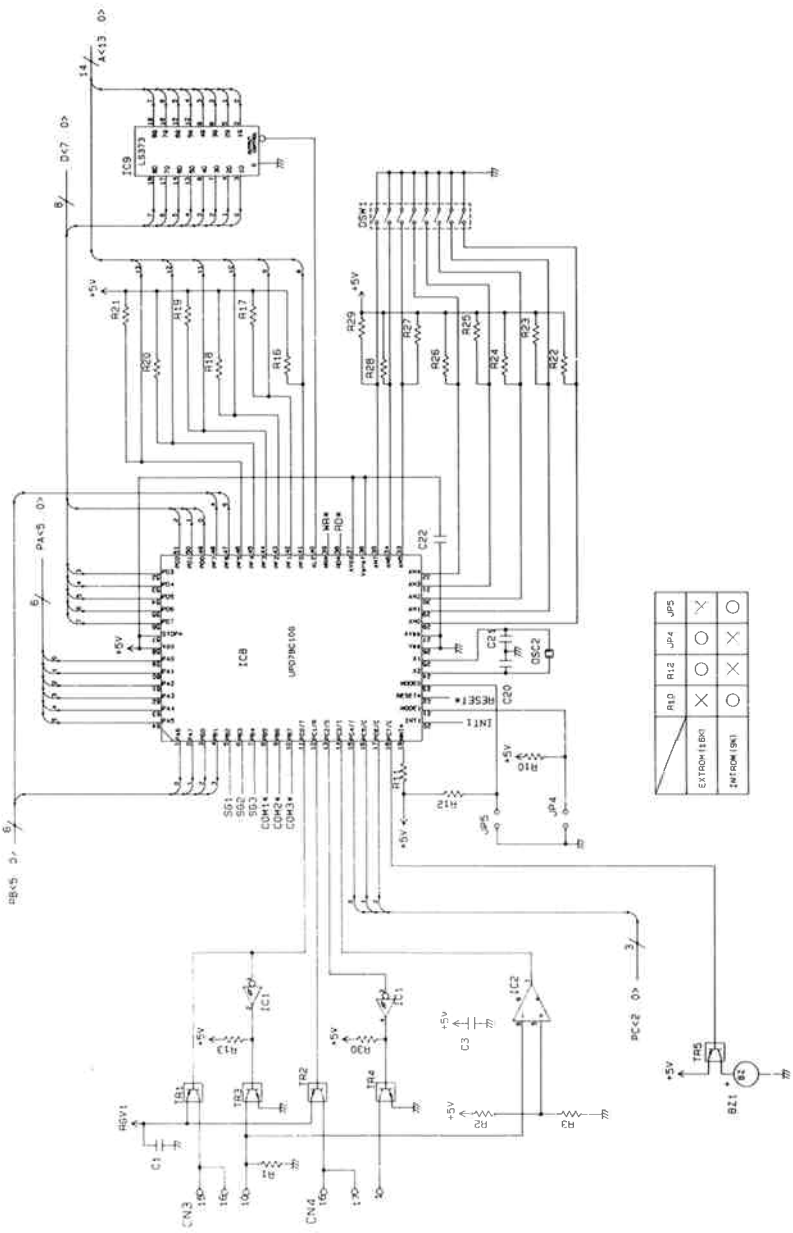
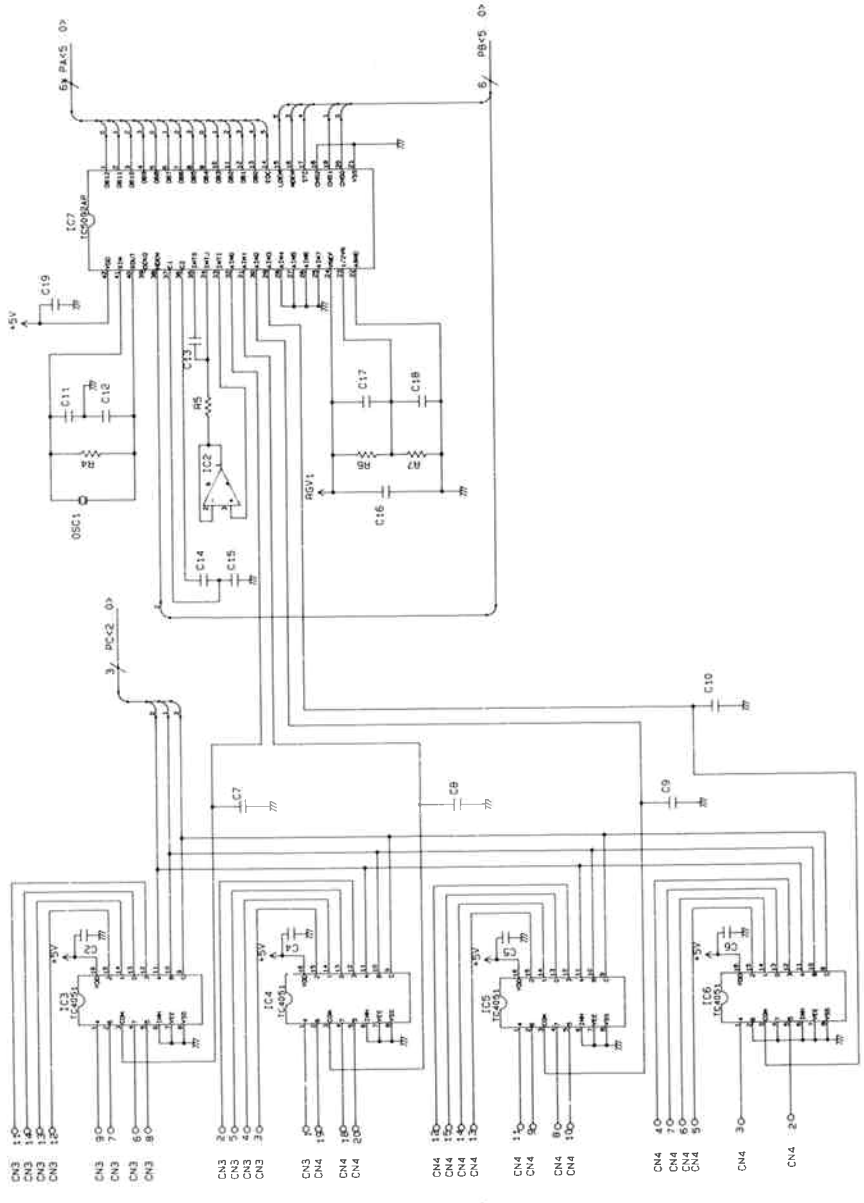
S. NP-EDITOR CONTROL CIRCUIT DIAGRAM

Editor Controller (1/3)



Editor Controller (2/3)



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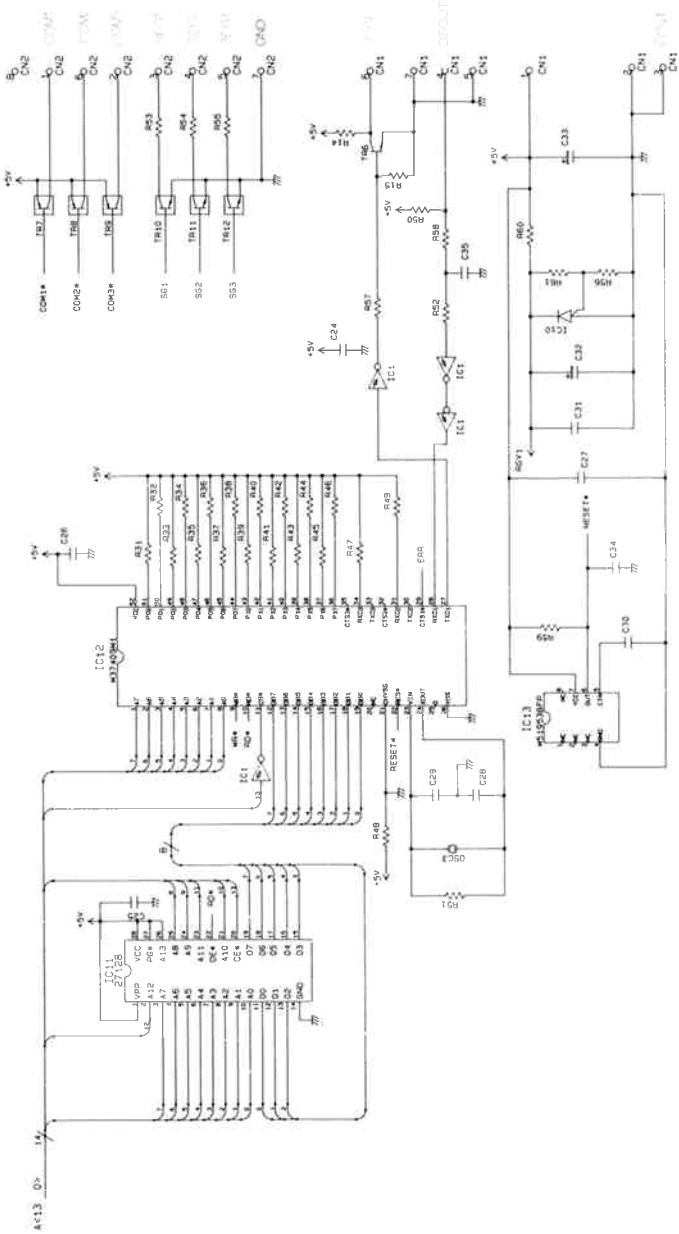

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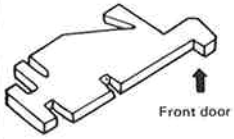
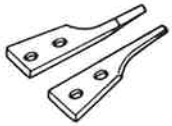
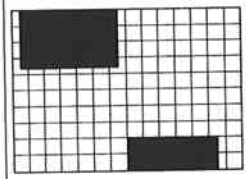
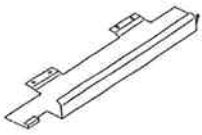
T. LIST OF SPECIAL TOOLS

Special tools which are required for servicing the copier (in addition to the standard tools set) are listed below.

No.	Tool name	Tool No.	Shape	Code	Application/remarks
1	Door switch actuator	TKN-0093		A	
2	Spring scale (compression)	CK-0054		B	• Measuring strength of cassette springs • Adjusting scanner drive cable tension
3	Extension blades for pliers	CK-0426		B	For removing grip rings: 4 – 9 mm
4	Cleaning oil	TKN-0464		A	
5	Text Sheet APS-A	FY9-9131		B	
6	Carrier replacing plate	TKN-0476		C	For replacing developoer in CD unit

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No.	Tool name	Tool No.	Shape	Code	Application/remarks
7	Knob	FA4-1047		C	For replacing developoer in CD unit

Note: Rank
A: Each service person should carry one with him.
B: A group of five service persons should share one.
C: Each workshop should keep one.

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U. LIST OF SOLVENTS AND OILS

No.	Material name	Use	Chemical formula, mixture ratio, etc.	Source	Remarks
1.	Ethyl alcohol (Ethanol) Isopropyl alcohol (Isopropanol)	Cleaning: copyboard, glass, mirror, etc.	C_2H_5OH $(CHZ_3)_2$ CHOH	Locally	Flammable. Use in a well-ventilated area. Avoid breathing concentrated vapor.
2.	MEK	Removing toner or oil stains	$CH_3 \cdot CO \cdot C_2H_5$ Methylethyl ketone	Locally	Flammable. Use in a well-ventilated area. Avoid breathing concentrated vapor. Avoid contact with eyes or skin. Do not use for cleaning the drum, plastic molded parts, or corona wires.
3.	Heat-resistant grease	Lubricating the drive mechanisms; e.g., copyboard driving gear, fixing drive gear, fixing ass'y, etc.		CANON	Tool No.: CK-0427 (500g/can) (Equivalent grease can be used, but should be able to withstand 200°C for extended periods of time.)
4.	Lubricating oil (low viscosity)	Lubrication points: Scanner rail, etc.		Locally	Equivalent oil can be used. Tool No.: CK-0451 (100cc) ISO VG 68 Oil ESSO Febis K68 MOBIL Vactraoil No. 2 SHELL Tonna Oil T68
5.	Lubricating oil (low viscosity)	Lubrication point: One-way clutch in pick-up control unit		Locally	Equivalent oil can be used. Tool No.: CK-0524 (100cc) ISO VG 220 Oil ESSO Febis K220 MOBIL Vactraoil No. 4
6.	Detergent	Cleaning covers and panels of the machine	Mild detergent solution	Locally	Dish-washing detergent is acceptable.

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